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PREFACE

TO VOL. VI.

THE Sixth Volume of PUBLIC HEALTH being now completed, it is a pleasant duty to acknowledge the great indebtedness of the Society to our Honorary Editor, Dr. Newsholme, for the very able and zealous manner in which, during the past year, he has discharged his labour of love, making the Journal not only a full and faithful record of the proceedings of the Society and of its Branches, but also a chronicle of all that is most important and interesting in the sanitary history of the period covered by it, and a summary of the progressive development of the various branches of sanitary science and practice both at home and abroad.

That the Journal has attained to so recognized a position in the estimation of the public, as well as become so valuable and almost indispensable an aid and help to the Health Officer in dealing with many questions that arise in the course of his daily work, is due to the care and sound judgment with which it has been developed by its present Editor on the lines originally laid down by Professor Wynter Blyth.

Congratulating Dr. Newsholme on the success already obtained, and heartily thanking him for the valuable services he has rendered to the Society, we would take this opportunity of pointing out that the present volume contains nearly fifty pages more matter than its predecessors, and that space is thus provided for a fuller account of the progress of sanitary research than had been practicable hitherto.

It is hoped that in the coming year this department of the Journal may be still more fully developed.

W. T. G. WOODFORDE,

President.

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Medical Officers of Health and other Correspondents are requested to send regularly all published reports and matters of interest bearing upon Sanitation to the Editor, 15, College Road, Brighton.

NOTICE.

THE INCORPORATED SOCIETY OF MEDICAL OFFICERS OF HEALTH.

20, Hanover Square, London, W, December, 1849.

NOTICE is hereby given that an ORDINARY MEETING of the ASSOCIATION will be held at No. 20, HANOVER SQUARE, W., on MONDAY, the 15th day of JANUARY, 1894, at 7.30 p.m, for the transaction of the undermentioned business:—

AGENDA.

1. Minutes.
2. Report of Council.
3. To Elect Candidates. The following candidates have been duly nominated for election:—

As Fellows—

GEORGE FRANCIS JONES, M.R.C.S., L.S.A., Clarence House, Southend-on-Sea, M.O.H. Southend-on-Sea U.S.D.; proposed by JOHN C. THRESH, seconded by S. R. Lovett.

ROBERT GRAVES BURTON, M.D.Edin., L.R.C.P.Edin., 1, Gloucester Villas, Hanwell, W., M.O.H. Hanwell U.S.D.; proposed by Frederick C. Dodsworth, seconded by John C. Thresh.

FREDERICK STOCKWELL, M.D., Benton, M.O.H. Benton; proposed by J. E. Hyatt, D.P.H., seconded by S. R. Lovett.

HENRY R. KENWOOD, M.B., L.R.C.P., D.P.H., Royal College Physicians and Surgeons, Lond., 189, Adelaide Road, N.W., M.O.H. Urban Sanitary District of Finchley; proposed by F. P. Wightwick, seconded by John C. Thresh.

As Associates—

ADAM, WILSON, L.R.C.P., F.R.C.S.Edin., Osborne House, Jesmond Road, Newcastle-upon-Tyne; proposed by Henry E. Armstrong, seconded by F. P. Wightwick.

H. W. NEWTON, L.F.P.S.Glas., L.F.A., 2, Ellison Place, Newcastle-upon-Tyne; proposed by Henry E. Armstrong, seconded by F. P. Wightwick.

SIR GEORGE A. PILKINGTON, M.R.C.S., J.P., Belle Vue, Lord Street, Southport; proposed by Edward Sergeant, seconded by John C. Thresh.

4. Nomination of Candidates.
5. Correspondence.
6. Miscellaneous business.
7. At 8 o'clock, a Discussion will take place on "VAGRANTS AND THE DISSEMINATION OF DISEASE." The Discussion will be opened by Dr. H. A. Armstrong, M.O.H. Newcastle-upon-Tyne, and Dr. E. Sargeant, M.O.H. Lancashire County Council.

F. P. WIGHTWICK, 5, Curlew Street, Horselydown, S.E.
J. C. THRESH, The Limes, Chelmsford.
Hon. Secs.

PROCEEDINGS OF THE INCORPORATED SOCIETY OF MEDICAL OFFICERS OF HEALTH.

A meeting of the Incorporated Society of Medical Officers of Health was held at No. 20, Hanover Square, on Monday, December 18th, 1893. Present: The President (Dr. W. T. G. Woodforde) in the chair. Drs. Armstrong, Eustace Hill, Lovell Drage, Wynter Blyth, Sergeant, Willoughby, Darra Mair, Jackson, and the Hon. Secretaries, Drs. Wightwick and Thresh.

The minutes of the last meeting of the Society on November 20th were read, approved, and signed by the Chairman.

REPORT OF THE COUNCIL.

The HON. SECRETARY read the report of the Council as follows:—

Your Council beg to report that they have considered the following references from the Society:

(*a*) Letter of the 27th ultimo from Dr. T. Eustace Hill, the Hon. Secretary of the Northern Branch, forwarding copy of a resolution that, in the opinion of the Northern Branch, medical practice by unqualified persons, which prevails extensively in certain districts of Durham and Northumberland and other parts of the country, interferes with efficient sanitary administration, and also directly and indirectly prejudicially affects the public health, and that it is desirable that the attention of Parliament be drawn to the necessity of further legislation to prevent such illegal practices, and that the Incorporated Society of Medical Officers of Health be requested to support the resolution, and forward it to the proper quarter.

(*b*) Resolution from the Northern Branch :—"That in the interests of public health in this country it is extremely desirable that the administration of the vaccination laws should not be in any way relaxed, and that the Local Government Board standard of efficient vaccination should be enforced in all vaccinations both private and public."

And have instructed the Hon. Secretaries to arrange for a full discussion of the same at ensuing meetings of the Society. Your Council have also considered the following resolution of the Northern Branch :—

(*c*) Resolution from the Northern Branch :—"That the Incorporated Society of Medical Officers of Health be recommended to approach the Local Government Board with the object of obtaining full powers of restraining the movements of vagrants during epidemic times, and of otherwise preventing the spread of malignant and other infectious diseases by vagrants."

And they recommend the Society to adopt the following resolution :—"That legislation is desirable with the object of restraining the movements of vagrants, and otherwise dealing with them during epidemic times, and that the Local Government Board be memorialised to obtain powers for local authorities for these purposes," and your Council further recommend in view of the importance of the subject that it should be further discussed at a meeting of the Society.

It was moved by Dr. ARMSTRONG, seconded by Dr. T. EUSTACE HILL, and resolved unanimously that the report be received and adopted.

Election of Fellows, etc.—The following gentlemen having been duly nominated for election, a ballot was taken, and they were declared by the CHAIRMAN to be unanimously elected :—

As Fellows—

W. L. ALLOTT, M.R.C.S., Hoyland Nether, M.O.H. Hoyland Nether.

JAMES BARR, L.R.C.P.Edin., D.P.H., 276, Deane Road, Bolton, M.O.H. Bolton R.S.D

WM. HENRY BARR, L.R.C.P. and L.R.C.S.Edin., Bury (Lancashire), M.O.H. Bury Union R.S.D.

FRANK BROADBENT, The Old Hall, North Collingham, Notts, M.O.H. to the Northern Division of the Newark U.S.D.

J. F. CHEESEWRIGHT, L.R.C.P., Greasborough, M.O.H. Greasborough U.

R. FORSYTH, M.D., New Hall, Birstall, Leeds, M.O.H. Birstall and Birkenshaw U.

THOS. ERNEST HAYWARD, M.B., F.R.C.S., L.S.A., Haydock (Lancashire), M.O.H. Haydock U.S.D.

CHARLES EDWD. HOLLINGS, L.R.C.P.Edin., L.R.C.S.E. and L.M., L.F.P.S.Glas. and L.M., Shaftesbury House, Calverley, Leeds, M.O.H. Calverley U.S.D.

J. J. JACKSON, L.R.C.P., Wakefield, M.O.H. Wakefield R.

ROBERT W. JEPHCOTT, L.R.C.P., L.R.C.S., The Laurels, Alcester, M.O.H. Alcester R.S.A.

WM. KNOTT, M.D., C.M., North Ormesby, Middlesborough, M.O.H. Ormesby U.D.

G. H. MOORHEAD, L.R.C.P.L., 387, Tony Street, Dudley Hill, Bradford, M.O.H. Hunsworth and Tong U.S.D.

ADAM MACVIE, M.D., M.B., C.M., Baildon, M.O.H. Baildon U.S.D.

ROBT. MCNICOLL, Hardshaw Street, St. Helens, M.O.H. St. Helens U.S.D.

J. PICKEN, M.B., C.M., Rawmarsh, M.O.H. Rawmarsh U.

EDWARD STANLEY ROBINSON, M.R.C.S., L.R.C.P., Lombard Street, Stourport, M.O.H. Stourport U.S.D.

ALFRED SWANN, M.D., Batley, M.O.H. Batley.

WILLIAM SCATTERTY, M.A., M.B., C.M., Keighley, M.O.H. Keighley U.S.D.

FRED. STEPHENSON, L.R.C.P., Wash Lane, Prestwich, Manchester, M.O.H. Prestwich.

THOS. COKE SQUANCE, M.D., M.S., F.R.M.S., F.R.Met. Soc., L.S.Sc.Durham, 4, Blanden Terrace, Sunderland, M.O.H. Sunderland Union R.S.D.

CHARLES W. THORP, F.R.C.S., Dobroyd, Todmorden, M.O.H. Todmorden U.S.D.

EDGAR D. WELLBURN, L.R.C.P.E., L.R.C.S.E., and L.M., L.F.P.S., Beech Villas, Sowerby Bridge, M.O.H. Sowerby Bridge U.S.D.

A. S. WILLIAMSON, M.B., C.M., Sandal, M.O.H. Sandal U.S.D.

JOHN WINN, L.R.Q.C.P., L.R.C.S.I., Poulton-le-Fylde, Preston, M.O.H. Fylde R.S.A.

M. YOUNG, M.B., Public Offices, Brighouse, M.O.H. Brighouse U.S.D.

As Members—

SAMUEL WILLIAM ALLWORTHY, M.A., M.D., D.S.M., 32, Crumlin Road, Belfast.

EDMUND M. SMITH, M.B., C.M., D.P.H., Whitwell House, Scarcroft Road, York.

HAROLD SCURFIELD, M.D.Edin., D.P.H.Camb., 9, Rectory Terrace, Sunderland.

As Associate—

DAVID FEE TODD, L.R.C.P., etc., Edin., Rectory House, Sunderland.

Nominations.—A number of candidates were then nominated for election at the next meeting.

The meeting then proceeded to discuss the question of

THE TENURE OF OFFICE OF THE MEDICAL OFFICER OF HEALTH.

The HON. SECRETARY (Dr. Thresh) stated that the arrangements for the meeting had been somewhat hurriedly made. He thought it might be advisable instead of having set papers at their meetings to have discussions on various subjects. The subject selected for that meeting was, "The Tenure of Office of the Medical Officer of Health." The importance of this question had been impressed upon him at the last meeting. He found that clerks of sanitary authorities on being appointed were appointed for life, and it seemed to him very singular that the clerks should be so appointed and the medical officer of health only for one or three years. This, no doubt, paralyzed in a very great measure much of the good which might be done by the medical officer of health. They were only appointed for three years, and were never sure they would stay in a district, and some might not therefore take that interest in a place that they otherwise would. They were dependent for their reappointment entirely upon their pleasing the authority. With reference to the question of compensation, if a clerk had an interest for life and his office was abolished he would get an adequate remuneration; but if a medical officer's post was abolished the remuneration which he would receive would be little or none.

Professor Wynter Blyth stated that he was very pleased to take part in the discussion. Dr. Thresh had asked him to throw some light on the legal aspect of the question. As far as he knew there was very little to be said on that point. There were a few medical officers of health, and a few only, who were appointed under a local Act, others under the Public Health Act, 1875, and others again under the Public Health (London) Act, 1891. There was some difference between "urban" and "rural" appointments. The 189th section of the Public Health Act stated that every urban authority should from time to time appoint a medical officer of health at the pleasure of the authority. These words might really seem to render the office of the medical officer of health insecure, but in practice it was not found so. The position "at the pleasure of the local authority" being more secure than when you have a definite term. With regard to his own appointment, and many others in London, they were "at the pleasure of the local authorities." There was no day when their term of office expired, and no necessity therefore to discuss their reappointment, so that although the words in the Act looked very dreadful, he maintained that really a medical officer of health appointed at "pleasure" was in a better position than one appointed for three or five years. He quite agreed that it was very desirable to have some security of tenure, and he acknowledged that under the existing law it was not good. He thought that there might be much to be hoped for from the recent action of the General Medical Council, who were making it more difficult for persons to qualify for the position of medical officer of health, and thereby limiting the supply. If those who were in the Public Health service would only stick together, and not apply for the wretched appointments advertised from time to time, no doubt the tenure and emoluments would become more satisfactory. If they could only stick together in the same way that working men did, he thought they would get the support of the public in what would be a sort of professional strike. He did not know whether it would be possible to get this combination, but he imagined that when appointments were advertised the Society might consider all the surrounding circumstances, and if they found a man could not properly do his duty to the public they should pass a resolution to that effect and publish it far and wide, and let it be well known that the conduct of anyone who applied for it would not be considered as professional. Of course, that would only act in the matter of future appointments; it would not touch those that were still existing. There were, he said, a great many who devoted their whole time to their office, and were wretchedly paid. Many were eminent men, and would have become eminent in private practice. They all knew that a man of ability who devoted himself to private practice in any large centre of population was certain to get on, and make three, four, or six times the income he would make under an appointment as medical officer of health. He knew a number of medical officers slaving away for £400 or £500 a-year, and he knew they would have been certain to have made a very large practice and very considerable incomes. For his own part he had always opposed the idea of a man giving up his whole time to his authority. It might be desirable theoretically, but the local authorities would never pay adequate salaries.

Dr. Lovell Drage (Hertford) stated that soon after he was appointed medical officer of health in a rural district he had occasion to take active steps to improve its sanitary condition, consequently he was brought into very violent collision with his authority, and directly they found that the Local Government Board were sending down an inspector they gave him notice to quit. Finding, however, that the report of the Local Government Board inspector was extremely grave, and entirely supported his representations, the local authority for very shame re-elected him. He was of opinion that a local authority should not be empowered to remove any officer without the consent of the Local Government Board. He thought the only body competent to judge as to how the duties of a medical officer were performed was the Local Government Board.

The following paper was then read by Dr. Armstrong:—

The Uncertainty of Tenure of Office by Medical Officers of Health in Relation to Sanitary Progress.

By Henry E. Armstrong, D.Hy., M.O.H. of Newcastle-upon-Tyne and the River Tyne Port.

The status of the medical officer of health has not altered materially since I had the honour of reading before the Society, just nine years ago, a paper on that subject, as a criterion of sanitary progress. At that time the outlook was not very encouraging. To-day, with certain exceptions, matters are on the whole *in statu quo*. The exceptions I refer to are, however, important, inasmuch as they are based on changes of principle in both metropolitan and provincial sanitary administration. These changes herald, it may be hoped, the dawn of a brighter day for the cause of public health and the members of our profession officially engaged or interested in promoting it.

At the present crisis a temperate statement of the views held by the Society as regards tenure of office and its relation to the important question of sanitary progress may, and it is hoped will, be of service in helping to bring about changes the need of which is generally admitted. That the terms on which many—probably a very large majority—of the medical officers of health of England and Wales are appointed has an effect for ill both on the office and the work they are engaged to do,

requires little demonstration. The sanitary services of medical officers of health whom our Society estimate highly as able, scientific, and conscientious men, have been lost to the country owing to the apparent economy or caprice, or disagreement on the part of the Authorities of the districts, or combinations of districts, for which they had acted. Speaking generally, appointments are made for periods, the mere length of which stamps them with insignificance. Thus, of 31 such, announced together in one issue of the Society's journal, PUBLIC HEALTH, taken at random, 14, or 45 per cent., were re-appointments for a period of one year only, and four were new appointments of the same duration. Of these nine were to urban and five to rural districts. The salaries for the urban officers ranged from ten guineas to £65, and for the rural from £3 to £100. Appointments and re-appointments with much higher salaries are not unfrequently made for a term of one year. "Brief life is here our portion."

How can the sum of a *vita brevis* such as this do otherwise than forbid us to entertain long hope of sanitary progress or improvement in our status? How can it be possible that really good men will apply for office on such conditions? Can an officer, no matter how able, highly trained, or conscientious, appointed on such terms, expect his opinions on sanitary matters to have weight with his authority, the other members of his own profession, or the inhabitants of the district over which he is placed? How can he expect to be able to direct and gain control over his inspectors, or secure the confidence of the public—so indispensable to his office? How can independence of action be looked for in one who has to go canvassing about among the electors every twelve months?

There are, of course, other considerations than the foregoing in relation to the making and the taking of office for short periods. Sanitary authorities, whether alone or in combination, do not care to bind themselves any more than they can help. In new appointments they not unnaturally prefer a short trial of their officer. But such trial, instead of fixing the officer in his position, may have the opposite effect by suggesting a course by which, without the necessity of proving incapacity, neglect of duty, or other reasonable ground for dismissal, he may be removed. On the side of the medical officer of health, if it can scarcely be said that he also has an equal right to a short trial of his appointment. He knows, or ought to know, beforehand, all the *pros* and *cons* of the office for which he may be inclined to seek. Notwithstanding this there can be little question that the unseemly rush of medical practitioners for public health appointments, no matter on what conditions, has a great deal to do with the unsatisfactory nature of the terms imposed. Among private practitioners the temptation to increase the income or to prevent the introduction of a rival are no doubt incentives to application for appointments, for which the would-be holders have no claim whatever beyond the fact that their names are on the Medical Register as entitled to practise medicine, surgery, and midwifery. Hence we have the very largely represented class of medical officers of health to whom the term of "half-timers" has been applied, viz., those who are also engaged in private practice. This form of combined service began in London, but is now beginning to die out there. It would be well for medical officers of health who complain of their status to remember that no one is obliged to take office on short tenure. "They who like it may; the rest may choose." It is difficult to understand, now that the Local Government Act of 1888 is in operation and County Councils have come into life, why the continuance of the short tenure of small, do-little appointments is not superseded by the general establishment of county medical officers of health with local medical officers for combinations of districts so arranged in point of size, etc., as to be sufficient to occupy the full time of the holders, and at a remuneration by salary and pension befitting the status and position of a professional man. Until this is done it would seem hopeless to expect anything like a satisfactory basis on which to establish the necessary control over small sanitary authorities by county councils, or fixity of tenure of office of medical officers of health. The time is perhaps not ripe for the entire reorganisation of the system as regards the holding of health appointments by private practitioners; but as in the metropolis this is gradually being brought about as appointments fall in, so should it be in the provinces.

This suggests the qualification and training of experts for the posts hereafter to be filled. When appointments are sufficiently large to occupy the time of the holder, exclusive of private practice, every candidate must necessarily have for the higher offices a degree in hygiene and for others a diploma in public health. The importance of previous practical training in the duties is now generally admitted, and is provided for by the regulations of the General Medical Council. As time progresses the feeling in favour of this idea will probably strengthen, and the post of assistant to medical officers of health will be regarded as a necessary step to office.

In conclusion, whether the proposals suggested above be carried out or not, it rests with medical officers of health and candidates for office to look out each for himself to see that the tenure of the office he holds or has in view is such as he can accept with hope of justice to those for whom he has to act and with dignity to himself.

DISCUSSION.

Dr. T. EUSTACE HILL thought there was no doubt that the present arrangements were most unsatisfactory. In his

own county not only were the medical officers of health appointed from year to year, but they were grossly underpaid. One of the best men in the county had been paid for one of his appointments the sum of £3 per annum, and for that he was expected to superintend the working of the Notification Act, prepare a report, and perform all the other duties of a medical officer of health. Lately he had rebelled and resigned, but there being no other medical practitioner in the district qualified to take the appointment, the authority proposed to reappoint him at a salary of £15. On submitting this to the Local Government Board they were informed that it was not the custom of that Board to appoint a man for less than £20. He was not sure that the county councils should not have the final appointment and removal of medical officers, rather than the Local Government Board. He believed the medical officer would be safer in the hands of the county councils.

Dr. SARGEANT quite agreed with the suggestion that the county councils should have some authority with respect to the appointment of local medical officers of health. He was sure it would be more satisfactory to the medical officer. At the present time the county councils had to pay half the salaries, but before appointments were made by the various authorities they had to receive the sanction of the Local Government Board, which seemed to him rather a roundabout mode of procedure. The paltry salary of £20 per annum was not sufficient to pay a medical man for the work he had to do—particularly considering the constant increase of work through returns, statistics, and other things. He thought if there were increased duties there ought to be increased salary, and he believed that the county councils would be willing to pay suitable medical men reasonable salaries. He thought the Local Government Board, who had a very great deal to do, might depute some of their duties to the county councils, who at the present time were not overworked.

Dr. WILLOUGHBY referred to the great difference between diplomas and degrees, and to the question of whole time, and he stated that he thought it desirable that a man's whole time should be devoted to public health and sanitary work, not to his local authority entirely, but to work of some form in the public health service. He thought it desirable to substitute large districts for a number of petty ones, and suggested that if the Local Government Board were to fix a minimum salary—say at about 20 times greater than now—as each post fell vacant, amalgamation would be the result, and they would then have to fix the salary at a living wage.

The PRESIDENT was inclined to think that they should rely on the county councils rather than the Local Government Board as the ultimate court of appeal. He referred to the address he had given at the last meeting, and quoted statistics as to the remuneration of medical officers of health. It seemed to him that the right and proper tenure of office would be such as applies to the vestry clerks and even to district medical officers for poor law.

The meeting then proceeded to a discussion on the subject of the Annual Reports of Medical Officers of Health.

The following paper was read by Dr. Vacher :—

ANNUAL HEALTH REPORTS.

By FRANCIS VACHER, F.R.C.S.Edin., M.O.H. to Cheshire County Council.

I was advised by the hon. secretary of this society that it was proposed to have a debate on the subject of "Annual Health Reports," and requested to open the discussion with a short paper. As during the past twenty years I have myself issued a report annually, and recently have been engaged in arranging and collating fifty-four reports of others, I could not plead ignorance of the topic. Yet in consenting to come here and take a part in this debate it is rather with the hope of acquiring than giving information.

We all, I doubt not, feel that the annual reports of the responsible advisers on sanitary matters of local authorities might be a storehouse of statistics, facts, experience, counsel, difficulties stated and difficulties overcome, etc., if only the said reports were issued in a form rendering them collectively accessible. What is wanted is that all reports should be compiled on a uniform plan and should be printed the same size. At present reports are planned in various ways, and every authority is a law to itself in the matter of reproduction. Many reports, if not most, are presented in manuscript, read, or taken as read, and filed; in the case of others a few extra copies, beyond the necessary four, are lithographed or manifolded or type-written. Of those that are printed a few appear in foolscap folio or 4to, a few in demy 4to, the size of most is royal 8vo. or demy 8vo., now and then 12mo. or crown 8vo. finds favour, while a large proportion are issued as proof slips from the galley of the local newspaper office.

My first proposition is, therefore, that all reports should be *printed*, the size of pages being the same. It stands to reason that reports intended to be printed will be more carefully drawn up than reports intended to remain in manuscript. In a year or two the latter are done with and forgotten, the former remain as permanent records of statistics, sanitary conditions, work done and work attempted. The quality of a report, and to some extent its quantity (though this is of less importance), will be improved when it is known it is to be printed. Again, if the size of page of all reports were identical, the reports for any registration district, or area large or small, could be bound together as a local record, and the reports for the whole kingdom, year by year, would be represented by so many uniform volumes. The county medical officer of health, also, would no longer be required to epitomize district reports, but the district reports together would be a ready-made appendix to the county report.

In answer to the question, What size of page would be most convenient? I would suggest the large 8vo. in which the far-famed Simon reports first saw the light. The Registrar-General's reports also appear in this size, and the annual reports of the Local Government Board and supplements. In any case the choice lies between this and demy 8vo. Foolscap folio is inconveniently large, and unless the page be divided into two columns, difficult to read. As to type, it should not be of less size than small pica, and it may be added that letters and figures are much more distinct in "old face" founts than others.

All reports should be in accord with the terms of the Local Government Board requirements.

By an order of the Local Government Board,

dated March 23rd, 1891, Article 18, Section 14, it is prescribed that every medical officer of health shall:—

Make an annual report to the sanitary authority up to the end of December in each year, comprising a summary of the action taken or which he has advised the sanitary authority to take during the year for preventing the spread of disease, and an account of the sanitary state of his district generally at the end of the year.

The report shall also contain an account of the inquiries which he has made as to conditions injurious to health existing in the district, and of the proceedings in which he has taken part or advised under any statute, so far as such proceedings relate to those conditions; and also an account of of the supervision exercised by him, or on his advice, for sanitary purposes over places and houses that the sanitary authority have power to regulate, with the nature and results of any proceedings which may have been so required and taken in respect of the same during the year.

The report shall also record the action taken by him, or on his advice, during the year, in regard to offensive trades, to dairies, cowsheds, and milk shops, and to factories and workshops. The report shall also contain tabular statements of the sickness and mortality within the district, classified according to diseases, ages, and localities.

Now although the report should comprise all above stated, it by no means follows that the best way of arranging the reports is in the order given.

I know of a report (and a very good one, too) which is divided into six sections, the first headed "A summary of the action taken during the year for preventing the spread of disease," the second headed "An account of the sanitary condition of the district at the end of the year," and so on. The result is certainly not in all respects satisfactory; if one wants information regarding any particular disease one has to seek it in two or more sections, whereas the population and area, births and deaths are not referred to till the last section is reached.

The question thus arises, What is the minimum of information which should be conveyed in a report? My answer may take the form of a third proposition.

All reports should furnish particulars and comments as regards the following matters, so far as applicable in each district: (1) Area and population. (2) Births and deaths, birth-rates and death-rates. (3) Deaths classified according to diseases, ages, and localities. (4) Zymotic diseases, notification, isolation in hospital, disinfecting apparatus. (5) Inquests, deaths not certified, deaths in Union premises and public institutions. (6) Water supplies. (7) Sewerage and sewage disposal, excrement and refuse collection and disposal, nuisance abatement, ordinary sanitary operations, inspector's report. (8) Action as to regulated trades and offensive trades. (9) Action as to unsound, diseased, unwholesome, or adulterated food. (10) Overcrowding, cellar occupation, houses for the labouring classes, common lodging-houses. (11) Public baths, recreation grounds, cemeteries, etc. (12) Special reports.

For uniformity's sake I would suggest that these subjects be dealt with in the order given. Information may also appropriately be given on many other subjects, such as meteorology, marriages, local industrial occupations, noxious vapours from factories, vaccination, canal boats, caravans, etc.

It is well, too, that a report should contain a brief reference to any general Acts relating to public health passed during the year under review. The sanitary authority is thus officially informed of legislation about which it should know.

It is scarcely necessary to add that all reports should expressly refer to any requirements. It often happens that such a necessary apparatus as a steam disinfector is required, or possibly bye-laws for slaughter-houses are needed, or regulations under the dairies, cow-sheds, and milk-shops order. It is not sufficient to mention these wants in one annual report. All requirements should be stated and re-stated till supplied.

As regards tabular matter, I have nothing to propose beyond that all reports should be accompanied by Tables A and B properly filled in, attention being given to the notes endorsed on the tables.

Some of those present may think that all reports are now thus accompanied, but this is not so. The tables are required to be used by all medical officers of health acting under the Local Government Board's orders, but there are still many medical officers of health who are paid wholly by the local authority, and who have not been appointed or re-appointed since March 25th, 1880, and who consequently do not come under the Board's orders. Thus in many important districts Tables A and B are ignored; in other districts they are used, but not properly filled in.

Many years ago (in 1881) I had a correspondence with the President of the Local Government Board, pointing out the want of uniformity in the tabular forms employed by medical officers of health, and asking that a standard series of statistical forms and instructions might be prepared and issued. But the answer given was that the Board had "already included in the forms A and B provision for all the statistical information which, in their opinion, could usefully be given on a uniform plan."

The above five propositions seem to me so reasonable that they need only to be stated to obtain general assent. I should like to add that the value of a report is very much enhanced by a good map on which the mortality from the principal zymotic diseases can be readily located. I show an excellent plan of a large urban district on which six different diseases are indicated by spots, round, triangular, and cruciform, in two colours.

A few words in conclusion on defects in reports. *Too short reports* are within the experience of all. The shortest report I have seen contained 127 words only (counting every figure as a word), and doubtless many present have seen shorter. Such a report cannot contain all the information

required by the Local Government Board to be given.

Prolix reports are probably less common. There are several types. In some the writer "fails to see" and "has yet to learn," and delights in roundabout expressions, recording unimportant events with full details. In others a pet hobby is trotted out and capers along showing all his fine points. Other reports I remember were remarkable for the poetry quoted—one might have gathered a compendium of English verse from a series of them.

Omissions. — Because the registrars are not required to give information of the number of births at so much a line and so much a return, some medical officers seem to think it is difficult to obtain such information, and thus many a report is issued which does not state even the gross number of births during the year. As regards sickness, again, in many a report the number of those under five years old is not stated; and the number of cases of sickness of a particular disease, reported as having come to the knowledge of the medical officer of health, is frequently less than the number of fatal cases of the same disease. Often, also, information as to area, uncertified deaths, and other as essential matters are not given.

Want of explicitness is a different defect to that last referred to, and far more general. For instance, if I read "dairies, cow-sheds, and milk-shops have been inspected and found in good order," the information does not strike me as explicit enough. I want to know how many persons engaged in the milk trade are on the register, the number struck off and the number added during the year, the number of visits of inspection, if the local authority has made regulations, if any case of infectious disease, human or bovine, has been reported in premises used by the milk trade. Again, when I read that "the emptying of middens is contracted for and supervised," I want to know something about the terms of the contract, and particularly whether the emptying is done every fortnight or every three weeks, or only when the pits are full. I could cite many other examples, but these two are enough. My position is this, that general statements are such light structures, they need but the lightest foundation; exact particulars in figures are quite different, and must rest on a solid foundation.

Whittling down the Death rate.— One is naturally unwilling to enter this among the defects of reports, but truth requires it. The whittling down is often done quite ingenuously, as when a man puts in his report the death-rate is so and so, "but making allowance for cases of inquest, new residents, and infants under one week," it is so and so. Still, ingenuously or otherwise, the whittling is done, and the reduced death-rate (and not the real one) is published and quoted and referred to year by year.

Places of health resort, at the seaside or inland are naturally the places in which there is a direct object in showing an exceptionally low death rate, and the places where, above all others, every legitimate effort is likely to be made with this end in view. I say "legitimate effort" because I do not believe that the medical officer of health who whittles down his death-rate is conscious of any unfairness. He probably believes that the watering-place he is interested in is so salubrious that it *must* have a low death-rate. If the death-rate came out high he would conclude there was something he had not taken into account. Then almost unlimited deductions may be made of deaths of imported cases of sickness, and the population varies so much at different seasons of the year, that when an estimate has to be made as the basis of death-rate calculations, it may easily be made too high.

The death-rate as regards the seven principal zymotic diseases is also sometimes whittled down. I have seen this death-rate given, without counting diarrhœa, several times. Then, when one of the seven zymotics is entered in the register as the cause of death, with a secondary disease added, the secondary disease is sometimes entered as the cause of death.

Careless Population Estimates. — Considering how almost all the calculations in a health report depend for their accuracy on a correct estimate of population, it is wonderful how rough some of the estimates are. Calculating that the rate of increase which took place during the two last intercensus periods will be maintained till the next census, one would think was a simple sum, yet numbers of medical officers of health never take the trouble to do it. Then if this calculation be made, how seldom is there any attempt to verify it (or otherwise) by reference to the local surveyor's returns of new buildings and the police return of uninhabited houses, etc. Really the usual way of estimating a population, especially in small districts (where one would think the means of making a correct estimate was readily accessible), consists in adding 50 or 100 or 150, as if proximate correctness were no object.

Then, though it is known that owing to the differences between one town and another as regards age and sex distribution of their respective populations, their crude death-rates require correction before they can be equitably used for purposes of comparison, who is at the trouble to make this correction before comparing the death-rate of his town with others? The factors for correcting the recorded death-rates in the 28 large towns were published by the Registrar-General in 1884.

Having thus briefly indicated my idea of a model report, and mentioned some defects noticed in reports, I will leave the further discussion of the subject in other hands. I wish, however, to state that in noting defects I have not specially referred to reports issued recently or in my own neighbour-

hood, but generally to defects observed from time to time in the many hundreds of reports medical officers of health have been good enough to send me ever since I entered the public health service.

DISCUSSION.

Dr. DRAGE briefly addressed the meeting, advocating the preparation of reports in a popular manner to secure general readers. At the request of Dr. Thresh he had written a short paper on the subject, but unfortunately could not remain to read it.

[Dr. Drage's paper, fully setting forth his views, will be found on p. 115]

Dr. ARMSTRONG was afraid that if they got into the habit of making popular reports they would fast develop into writers of fiction. He thought he could lay claim to having written as many reports as most men—probably even Dr. Dudfield had not written more—and he therefore felt some interest in it. He agreed with what Dr. Vacher had said, "all requirements should be stated and re-stated until supplied." After twelve years' continuous digging at his authority he had at length got an isolation hospital. He did not think forms "A" and "B" of the Local Government Board quite sufficient. He thought he could equal Dr. Vacher in the matter of short reports. He did not know the number of words, but he had seen one with only fifteen lines. Poetry he remembered well, and also the introduction of very extraneous matters into reports. Some day he hoped they would have uniformity. The preparation of annual reports was a thing that should be taught to candidates who were going in for sanitary qualifications, and it should also form part of the examination for diplomas. He would like to see the whole question gone into, and thought perhaps the old committee of the Society who had the matter under consideration some years ago might be resuscitated, or, if not, then reborn.

Dr. WOODFORDE: I rather think their report was sent to Mr. Noel Humphreys at the General Register Office, and I believe it still remains with him.

Dr. ARMSTRONG: I beg to move that the Hon. Secretary be requested to obtain information as to the proceedings of the old committee, and report at the next meeting, with a view to their reconsidering the subject, or to the appointment of a fresh committee if necessary.

The motion was seconded by Professor BLYTH, and carried.

Professor BLYTH desired to say a few words on the subject of annual reports. He thought it ought to go forth as the opinion of that meeting that the ideas held by Dr. Drage were not the views of most of them. The reports should be primarily for the information of the sanitary authority and for experts. They were not called upon to make readable reports for the general reader. If they were then the more comical the report the better. It might even be illustrated. He thought the lines laid down by Dr. Vacher were those they were prepared to agree to. He admired very much the way Dr. Vacher marked his map; but it had one defect, the defect of all spot-maps. It should be shaded according to population. That was most important, because you saw a tremendous lot of "X's" and other marks in a certain place, but had no information as to whether the population was dense there or not. He did not think it would be extremely difficult to have maps shaded in a way that would show perhaps a maximum, medium, and minimum density of population.

Dr. EUSTACE HILL thought the matter of annual reports was somewhat connected with the last subject, "The Appointment and Tenure of Office of the Medical Officer of Health," as a man with a good appointment would be more likely to get a good report. He referred to the benefit which had accrued since district reports had been collated by medical men, omissions and defects being gradually remedied. With regard to Dr. Vacher's reference to the importance of having correct estimates of population, he knew one district where the death-rate was just over 17 immediately before the census, and after it 22. Of course, the figures published by the medical officer of health had been absolutely useless. He had taken the trouble to calculate by logarithms the estimated population all through his district for five years, and he intended sending that estimate to the medical officers in the district. He did not know whether others might think it wise to do the same. He referred to the alteration made by the Local Government Board during the past year in their forms "A" and "B" with respect to ages, and to the inconvenience and trouble it had caused, and he expressed his opinion that the Local Government Board should have sent notice of such an alteration, so that calculations might have been made accordingly.

The CHAIRMAN, in expressing his pleasure at the discussion, desired to say how necessary he felt it to be that annual reports should be printed. He was glad that Dr. Armstrong had raised the question of the resuscitation of the old committee, or, if necessary, the appointment of a new one, because he thought much good might be done in the matter.

CORRESPONDENCE BETWEEN INCORPORATED SOCIETY OF M.O.H. AND THE LOCAL GOVERNMENT BOARD.

The Sanitary Institute, Parkes Museum, 74A, Margaret Street, London, W., June 27th, 1893.

SIR,—While my committee had under consideration the suggestion with reference to a joint examining board submitted to them by the representatives of the Incorporated Society of Medical Officers of Health, they received from the Local Government Board a copy of the report which your society sent to that board, with a request for an early answer. In these circumstances my council were compelled to write direct to the Local Government Board, and I forward for the information of your representatives a copy of this letter.

I shall be obliged it you could kindly let me have two prints of the interim report of the sub-committee of the Council of the Incorporated Society of Medical Officers of Health.—I am, etc.,

E. WHITE WALLIS, Secretary.

Shirley F. Murphy, Esq., 41, Queen Anne Street, W.

The Sanitary Institute, Parkes Museum, Margaret Street, London, W., June 15th, 1893.

SIR,—The council of the Sanitary Institute have had under consideration the communication from the Incorporated Society of Medical Officers of Health which you have courteously forwarded to them.

They do not think it necessary to answer this communication in detail, as many of the points raised have no direct bearing upon the main purport of the report, which is apparently, that the Society of Medical Officers of Health should exercise a large share of control over the arrangements for the examination of sanitary inspectors, by nominating a proportion of the examiners.

The Sanitary Institute have, as is admitted, already secured to the medical officers of health a large share of control over these examinations by the appointment of a due proportion of medical officers of health on the examining board, which, in its present constitution, is really a conjoint board representing the various professions interested; moreover, as has already been explained in my letter of March 10th, the medical officers of health on the board are all members of the council of the Society of Medical Officers of Health.

The council do not concur in the reasons adduced for the proposed change by the Society of Medical Officers of Health to the accuracy of some of which they are prepared to take exception, nor do they see any public necessity for a modification of the system which in its present constitution and working has received the approval of your board.

Should your board, however, consider that greater efficiency would be secured by allowing other societies connected with the public health service to have a voice in the nomination of examiners, the council of the Sanitary Insti-

tute would be prepared to provide for this in the following manner:—

The proportionate representation of professions on the board of examiners to be maintained as at present, viz., one-half medical examiners, and the other half engineers, architects, surveyors, and others connected with public health, in such proportion as may from time to time be considered advisable.

With regard to the medical section, the Sanitary Institute would be prepared to elect half of these examiners from a list of double that number nominated by the Society of Medical Officers of Health.

The proposal of the Society of Medical Officers of Health as it stands would exclude from the Board men eminent in sanitary science, such, for example, as the late Professors E. A. Parkes and F. de Chaumont, Dr. J. Sutherland, and other medical men, however distinguished, who might from any cause feel indisposed to join the Society of Medical Officers of Health.

With regard to the other professions, at least one quarter of the board of examiners should, as at present, be engineers or municipal surveyors. One half of this number the council would be prepared, if thought desirable, to elect from a list of double the number nominated by the Incorporated Association of Municipal and County Engineers, whose members form a very important part of the sanitary service of the country.

The remainder of the examiners would be selected by the Sanitary Institute, and would include members of the medical profession, engineers, architects, and others who have a thorough knowledge of the subjects dealt with in the examinations, thus enlarging materially the source from which examiners may be selected.

Should the Local Government Board think it necessary or desirable to add to the board one or more representatives of that department, either as examiners or as official visitors to the examinations, the Sanitary Institute would be glad to receive them.

The adoption of these suggestions would obviate the disadvantages which would inevitably arise if an entirely new board were established.

Amongst these disadvantages it may be pointed out that the formation of a new board would result in the loss of continuity, as well as of the experience in conducting these examinations which has been gained during the past sixteen years, and has secured the harmonious and efficient working of the system.

The Sanitary Institute has grave doubts whether an entirely new board would be able, at any rate at first, to work with the same harmony and effect.

Moreover, whilst the number of candidates may probably be large until nearly the whole of the sanitary inspectors in the kingdom have received certificates, afterwards the number cannot be expected to exceed three or four hundred per annum; some elasticity in the arrangements which govern the expenses of the staff would therefore be necessary to meet fluctuations.

The Sanitary Institute is making and supervising the arrangements for the examinations, utilises its officers and its staff and can meet these varying requirements, whereas an independent board would require its own officers, staff, clerical establishment, etc, and would incur a considerable and unnecessary expenditure, which would probably exceed the receipts should the numbers to be examined fall off.—I am, etc.,

(Signed) T. CRAWFORD, Chairman of Council.

To the Secretary of the Local Government Board.

Local Government Board, Whitehall, S.W.,
September 14th, 1893.

SIR,—I am directed by the Local Government Board to advert to the representations made to them by the Society of Medical Officers of Health, relative to the examinations for sanitary inspectors conducted by the Sanitary Institute for the purpose of giving certificates of competency under section 108 (2) (d) of the Public Health (London) Act, 1891.

The Board direct me to state that they have received communications from other bodies who desire either to be authorised to hold examinations for the purpose referred to, or that a joint board should be set up, and the Board have been in correspondence with the Sanitary Institute on the subject.

The Board forward for the information of the Society of Medical Officers of Health the enclosed copy of a letter which they have this day addressed to the Sanitary Institute expressing the opinion that the holding of examinations and the granting of certificates should be by one body rather than by a number of bodies acting independently, and suggesting the formation of a joint board for this purpose, and a preliminary conference at this office on the subject. The Board would be obliged by being informed whether the society would be ready to send representatives to take part in such a conference as is proposed in this letter.—I am, etc.,

S. B. PROVIS, Assistant Secretary.

F. J. Waldo, Esq., M.D.,
Common Room, Middle Temple.

Local Government Board, Whitehall, S.W.
September 14th, 1893.

SIR,—I am directed by the Local Government Board to advert to your letters respecting the communications which have been addressed to them by the Incorporated Society of Medical Officers of Health, the British Institute of Public Health, and the Sanitary Inspectors' Association relative to the examinations for sanitary inspectors conducted by the Sanitary Institute for the purpose of giving certificates of competency under section 108 (2) (d) of the Public Health (London) Act, 1891.

It appears to the Board, as intimated in their letter to the Sanitary Institute of December 21st last, that it is desirable that some arrangement should be devised with a view to the holding of examinations and the granting of certificates for the purpose by one body, rather than by a number of bodies acting independently; and the Board are inclined to the opinion that this result could be best secured by the creation of a joint board on which the different bodies interested might be represented. The bodies which the Board think might appropriately be represented on such a joint board are: The Sanitary Institute, the Incorporated Society of Medical Officers of Health, the British Institute of Public Health, the Association of Municipal and Sanitary Engineers, the Institute of British Architects, the Institute of Civil Engineers, and the Worshipful Company of Plumbers.

The functions of the joint board might be to appoint the examiners, and generally to organise and conduct the examinations and grant certificates.

Before further considering the matter, the Board would wish to be in possession of the views of the several bodies named as to the arrangement suggested, and with this object they would be glad if a conference could be arranged between representatives of each of the bodies mentioned and the Board's Parliamentary Secretary. If this proposal should commend itself to the bodies concerned, the Board would arrange for the conference to take place at this office.

The Board would be obliged by being informed whether the Sanitary Institute would be ready to take part in such a conference.—I am, etc., S.B. PROVIS, Assistant Secretary.

Sir Thomas Crawford, K.C.B., M.D., Chairman of the Council of the Sanitary Institute.

At a special meeting of the Council of the Society on November 13th, it was resolved *nem. con.* that the Council was of opinion that the examination of persons desirous of qualifying for the appointment of Sanitary Inspector should be organised and conducted by a conjoint board constituted of members elected by the councils of such societies as may hereafter be selected, and that the conjoint board should appoint examiners. It was agreed that in the opinion of the Council the conjoint board should include representatives of the Incorporated Society of Medical Officers of Health, the Sanitary Institute, and the Association of Municipal and Sanitary Engineers; and the addition of the British Institute of Public Health to the above list was subsequently carried.

PROCEEDINGS OF THE NORTH-WESTERN BRANCH OF THE INCORPORATED SOCIETY OF MEDICAL OFFICERS OF HEALTH.

THE ordinary meeting of this branch was held at the rooms of the Chemical Club, Manchester, on Friday, December 8th, at four p m. Present: Drs. Paget (president), Adams, Anderson, Etches, Hope, Jordan, Niven, Pilkington, Porter, Robertson, Sargeant, Vacher, and Wheatley. Mr. C. I. Lomax, C E., was also present as a visitor.

The minutes of the last monthly meeting were read and confirmed.

A letter was read from the Hon. Secretary of the Incorporated Society of Medical Officers of Health, asking what day of the week would best suit the members of the branch for the monthly meeting of the Society. It was understood that the present day, Monday, was not convenient for country members.

On a vote being taken, a majority of those present were found to be in favour of Friday. The hon. secretary of the branch was accordingly instructed to write to the Society that Friday would be the most convenient day.

The following having been nominated at the last meeting, were duly elected as members:—

T. E. Hayward, M.B., F.R.C.S., Medical Officer of Health for Haydock.

S. G. Moore, L.R.C.P., Assistant Medical Officer of Health for Liverpool Port.

HISTORY OF AN EPIDEMIC OF TYPHOID FEVER, INCLUDING CONSIDERATION OF THE MEANS OF PREVENTION OF THE DISEASE IN MIDDEN TOWNS.

By CHARLES PORTER, M.D., D.P.H. Camb., M.O.H. County Borough of Stockport.

(*Continued from page* 85.)

The question of the water service in each district and in each case has received special attention. The three most affected areas may, with considerable accuracy, be said to have each received their supply from a different source. The district of Edgeley has derived its water from a deep well in the red sandstone, this water being of exceptional purity, and the service constant throughout the summer. The affected districts of the Middle and St. Thomas's wards were supplied with filtered upland surface water from the gathering ground at Disley. Inquiry as to the occurrence of enteric illness amongst the company's employés and the inmates of the houses on the catchment area was made with negative results, and this water, though not as pure as that supplied to Edgeley, was not shown by chemical analysis to be unfit for drinking purposes. The same remark applies to that supplied to the Heaton Norris district, and which is purchased from the Manchester Waterworks. An inspection of the plans of the water mains of the most affected localities showed that each of these areas constituted but a fractional portion of the otherwise comparatively unaffected district to which the same water was supplied by the same mains. The dates of the two periods during which nightly intermissions of the supply were made in the Middle and St. Thomas's district and in the Heaton Norris district was in the first instance coincident with a rise, and in the second with a fall of the typhoid curve; it, therefore, seems reasonable to eliminate, as practically immaterial, the influence of intermission of the supply. Finally, as regards water supply, the conceivable possibility of infected liquid from privy contents heaped in the road during the process of night-scavenging finding its way, in times of intermittent supply, into the mains through the ball-valves of street hydrants has been considered and eliminated as improbable.

I am, therefore, not in possession of evidence to justify a conclusion that a causal relation existed between the water supply and the recent outbreak.

With reference to the milk supply, I have been unable to definitely associate any special milk service to any great extent with the general outbreak. As regards Edgeley, however, the following facts are worthy of remark: From June 15th to July 10th thirteen cases were reported which received their milk from six different sources. On July 10th an inmate of a certain milk shop sickened with enteric fever, and it was elicited that the sufferer had been in the habit of playing near a privy infected by the excreta of one of the thirteen cases alluded to. From July 10th to August 5th nine cases were notified (on July 10th, 12th, 13th, 21st, 22nd, 26th, 27th, and 28th respectively) in houses obtaining milk from the shop in question, and situated in its immediate neighbourhood. On the other hand, it must be noted, that during the same period and in the same vicinity enteric fever was reported in sixteen other houses, deriving their milk service from eight other distinct and different sources. Inspection of the two farms at which this vendor purchased milk revealed the fact that the cans were washed with water obtained, in one instance, from a dirty-looking pool in the field in which the cattle were grazing, and in the other from a shallow well in suggestive proximity to the privy-midden, and subjacent to the imperfect channel, along which passes to the sumpt-hole so much of the sink waste-water of the house as does not soak into the ground. There was, however, no history of any recent illness amongst the inmates or the cattle, nor on inquiry could anything of the kind be discovered amongst the local consumers of milk from these farms. With this exception there does not appear to have been any marked grouping of cases round a source of milk supply, and I am disposed to believe that the milk of the vendor referred to, if contaminated, became infected at the vendor's shop.

The occurrence of seven cases of typhoid fever amongst the inmates of, and workers in, a house used as a pork-butcher's shop seemed to demand special investigation, and it was found that all the sufferers were in the habit of using a privy into which had been thrown the discharges of a person living in the adjoining house, who had been suffering from severe diarrhœa and extreme prostration for some time before, but whose illness had not been recognized as typhoid fever. Careful inquiry as regards the subsequent cases that occurred in this neighbourhood failed, in every instance, to establish any connection between them and the seven cases referred to. In another house it was found that for three weeks a child of ten years of age, who had been attending her sick mother and frequently removing her copious diarrhœal discharges, had also at the same time been engaged in serving out provisions in the small general shop which her parents kept, but, as in the preceding case, inquiry failed to show that any subsequent occurrence was in any way traceable to this.

In at least thirty-seven other cases the use of privies which had recently received the excreta of persons known to have been suffering from typhoid fever, offered the most probable explanation of the occurrence of the disease. In one instance an inmate of a very insanitary back-to-back house sickened with typhoid fever, and the alvine discharges were thrown into a privy-pit used by the occupants of fourteen other houses, of whom six developed typhoid within about a fortnight. In Wesley Street, off Hillgate (where is situate the upper end of a sewer with a gradient of 1 in 20, which joins the equally steep Hope's Carr main outlet sewer, not far from its upper extremity), a group of six cases occurred, inquiry into which revealed the fact that the sufferers lived in a row of very old and dirty houses, possessing no apparent means of through ventilation, and unprovided with any drains, the slop water being thrown on to the street or into the street gullies, which were in consequence frequently stopped up, and then gave rise to a most offensive nuisance. The first of these sufferers was taken ill on July 17th, but no doctor was called in till July 31st. During this period the infected discharges of this patient were thrown into a privy-pit used in common by the inmates of seven houses in the street, of whom five had developed enteric fever before the end of the first week in August. It was in this street that one of the disinfecting staff caught a person in the act of throwing the excreta of a typhoid patient into the street-grid. The sewer beneath was at once flushed with a thousand gallons of corrosive sublimate solution (1 in 1,000), and, happily, no further outbreak has so far occurred along its course. A group of nine cases which have occurred in Portwood Ward amongst the inmates of the houses bounding a yard known as Marsden's Court, seems to afford very strong additional evidence of the infection-disseminating influence of midden privies in crowded localities. In the courtyard in question are two large structures of the kind referred to, used in common by the members of nineteen families. About the middle of July a severe case of diarrhœa occurred in a house in the court, and the discharges were thrown into one of these middens. On August 1st a case of recognised enteric fever was reported in the adjoining house, and eight further cases were notified on August 12th and September 5th, 8th, 17th (two), 18th (two), and 19th respectively, five of the sufferers being inmates of one family. Throughout the whole of the rest of Portwood (which has a population of 8,195) there were during the same period (from middle of July to September 26th) only three other cases, a fact fact which appears to impart a striking prominence to the influence of the infected middens in spreading the disease in Marsden's Court. In another case the fever has appeared in a house provided with a water closet, and which had been inhabited for eleven weeks before the house drain was connected to the public sewer. At yet another house in which the disease had manifested itself, it was found that the drains had been so badly laid—without proper regard to bed, socketting, or incline—that they had to be taken up and relaid a comparatively short time before, but not till after the soil by which they were surrounded had been polluted by the leakage from them. As already noted, the meteorological conditions which prevailed this summer are exactly such as would set a light to the mine of illness and death which had thus been prepared for those living in proximity to these filth-saturated soils. Section 25 of the Public Health Act, 1875, states that no house in an urban district may be lawfully built or occupied until proper covered drains have been constructed to the satisfaction of the urban authority, and the association of typhoid fever with the instances of defective drainage conditions above referred to demonstrates, if anything can, the imperative necessity which exists for the appointment in all communities of efficient and trustworthy building inspectors, and accentuates the very great importance of their functions.

I shall now attempt to summarise the steps taken to cope with the disease. These include :—

1. The provision of sanitary pails for the reception of all discharges coming from, or fluids used for washing the persons or clothes of, infected individuals.

2. The emptying and attempted disinfection of infected privy-pits.

3. Stoppage of the suspicious milk supply.

4. Much activity in the detection and abatement of insanitary conditions generally.

5. Circulation of the accompanying cautionary notice, and free distribution of disinfectants.

My recommendations to the Sanitary Committee included the following :—

1. "The provision of flushing apparatus, whereby every important sewer may be flushed from its upper or dead end."

2. "The provision at the upper or dead ends of the main sewers, and especially those with steep gradients, of ventilating shafts six inches or more in diameter (where not already existing), leading from the crown of the sewer to the side of the road, and thence up houses or buildings clear away from all windows or chimneys."

3. "The construction at various points on the sewers of steep gradients (where not already provided) of a tumbling bay with manhole and ventilator, and with a flap-valve applied to the mouth of the sewer delivering sewage from the higher level. The sewer-air in its course upwards meeting the flap-valve is thereby forced to escape into the outer air through the ventilator, and so does not reach the higher part of the sewer."

Some engineers, I am aware, object to the employment of tumbling bays as complicated arrangements liable to get out of order, and believe that a much more efficient flush can be obtained by a valve opened by hand, viz., a pivoted valve with ground facing. This is, however, a question of structural detail, which does not affect the principle of my recommendation.

4. "That excreta-sterilizers such as are in use at Hornsey, Newcastle, etc., or suitable incinerators, be provided for rendering innocuous the infected excreta of enteric fever patients."

At present the night-soil men have directions to bury the excreta deeply between layers of quicklime at one of the "tips." Even if they adopt the precautions indicated, which is very doubtful, such a method of disposal is anything but satisfactory, as it cannot be relied upon to render innocuous the germs of enteric fever, which are probably capable of remaining latent for long periods, though I am aware that some question the truth of this assertion. Dr. Cayley, in his Croonian Lectures already referred to, cites the well-known instance related by Dr. von Gietl, wherein a man employed to remove manure, in which the alvine discharges of typhoid sufferers had been buried nine months before, contracted typhoid, and adds: "I have recently seen an instance in which an interval of two years occurred without apparently any fresh importation of the poison."

Another objection to the deposit of typhoid excreta at the only available tip is that the site of this tip is upon a stratum of porous Permian sandstone. With the experience of the famous outbreak at the village of Lausen, in the valley of Ergaltz, where the virus was shown to have passed through a distance of many thousand feet under a mountain, the possibility of the deep well water becoming contaminated, though probably a remote contingency, can hardly be altogether ignored. The necessity for the provision of incinerators or sterilizers is therefore, I think, self-evident.

My next recommendation was as follows :—

5. "That as regards the drains of new buildings, good beds, firm joints, and requisite gradient be insisted on; that such drains be actually tested with the water-test after being laid and before being covered in, as otherwise it is impossible to ensure them being water-tight, even when everything is to all appearance sound; that they be disconnected from the public sewer by the interposition of a syphon-disconnection trap; and that no new building be permitted to be occupied until it has been certified to be in accordance with the requirements of the Bye-laws and Public Health Acts." The occurrence, to which I have already alluded, of enteric fever in houses with badly constructed and incomplete drainage arrangements, demonstrates the importance of enforcing the above suggestions.

Mr. De Courcy Meade, M.Inst.C.E., in an able report to the Hornsey Local Board "On Intercepting Traps and Water-tight Drains," says, "The object of this bye-law is to exclude from the drains the foul gases which are generated in sewers, but it must be read in conjunction with the bye-law which provides for the efficient ventilation of drains by means of two untrapped openings." Again he says, "I find that, even under favourable conditions, the velocity of air in sewers is much less than usually found in properly made (house) drains; consequently the air of sewers, although more impure, is diluted by fresh air to a much smaller extent, and therefore should be removed, as far as practicable, from the dwelling." On the subject of the application of the water-test to drains on the completion of a building, Mr. Meade remarks: "With ordinary care there is no reason why all drains should not be laid in such a manner as to be perfectly water-tight, not only at the time they are laid, but also after they have been covered in and the building completed. Drains properly constructed will remain in a perfectly water-tight condition. I have had opportunities of testing the drains of houses which had been laid many years previously, and I found them perfectly water-tight. It is of little use to test sections of a drain before it is covered in, and to omit the final test of the finished drain on the completion of the building. The smoke test, although convenient for testing traps and fittings above ground, is of no value in testing underground pipes. A drain may be leaking at every point, and yet appear perfectly sound on the application of the smoke test."

Regarding the influence of intercepting traps on the ventilation of the sewers, there is certainly strong reason to believe that defective house drains, which are not self-cleansing, are to a considerable extent answerable for the excessive quantity of gas which accumulates in some of the sewers. Obvi-

ously, disconnection of the house-drain and its ventilation by means of two untrapped openings within the curtilage of the house, will go far towards preventing the accumulation referred to within the sewer.

My final recommendation was: —

6. "That in view of the approaching execution of the sewerage scheme, the erection of privies in connection with new property be as far as possible prevented, and that conversion of the midden to the water carriage system be encouraged."

I am convinced that it would be hard to exaggerate the baneful effect of the midden-privy system which obtains in Stockport, as in most other Lancashire towns, but which is so truly barbarous and essentially injurious to health. Apart from the wholesale soil-pollution that must inevitably be the result of the leakage from and scavenging of these objectionable structures, and from the fact that, in some instances, the contents have to be carried in baskets through the dwellings before they can be deposited in the night-carts, the evidence of their disease-disseminating influence during the past summer is incontestable, and is a striking comment on that sentence in one of Sir George Buchanan's official memoranda, "in enteric fever the evacuations should be regarded as capable of communicating an infectious quality to any night soil with which they are mingled in privies.'

The question, however, of how best to deal with this objectionable condition of affairs as regards the present means of disposal of excrement in Stockport, is fraught with difficulty, and is one upon which I shall wait your comments with special interest. The Authority, as a whole, are convinced of the impropriety of the present system, but as regards the adoption of water-carriage, apart from the opposition which would certainly be raised by property owners (even though predestined to fail), they are hampered by the present incompletion of the sewage scheme. Until the completion of the intercepting sewers, which the execution of this scheme will provide, each additional water-closet, if effectively drained, means additional pollution of the river. Again, in many parts of the town the existing sewers are unsuitable in level, size, structure, or in all three attributes for the reception of water-closet sewage. The difficulties of the increased supply of water which would become necessary, and of preventing wholesale disorganization of the water-closet system in times of severe frost, do not appear so formidable, as they can be obviated by the employment of an approved form of slop-water-closet.

In regard to the pail system, the unsatisfactory experience of Manchester has been such as has led my Authority to view the adoption of that system with disfavour. Personally I am free to admit, if the facilities existed in Stockport which exist in Halifax for obtaining the absorbent materials with which their pails are lined, and for deportage of pail contents by canal to agricultural districts, I should welcome the adoption of the Goux system as a step in the right direction. However objectionable small filth accumulations in pails may be, they must certainly be less so than the tons of fæcal matter which are undergoing decomposition in the enormous midden privies described, which lade the atmosphere with putrefactive emanations, and pollute the soil by leakage. The important practical question whether the entire cost of conversion to whatever system may be decided upon is to fall on property owners, or whether the Corporation of a large town might not with, as I am inclined to believe, actual business advantage in the direction of diminished cost of scavenging, become responsible for a portion of the necessary pecuniary outlay, is another point as regards which I shall be indebted to members for an expression of their views.

The adjourned debate on Dr. Porter's paper, "History of an Epidemic of Typhoid Fever," was then resumed.

Discussion.

Dr. Wheatley said: Perhaps the most interesting of the points raised in Dr. Porter's valuable paper was the cause of typhoid fever. The idea that typhoid fever may be caused by decomposing fœcal matter has many attractions. It will in most cases give us a very simple and easy explanation of the origin of any case, and save us a world of trouble in trying to connect it with some previous case. But to my mind it does not seem very probable when looked upon from a bacteriological point of view, or studied by the history of epidemics. The principal points in MM. Roux and Rodet's paper seem to be: (1) That the bacillus coli communis differs from the bacillus of Eberth in no essential. (2) That the bacillus is usually found in water that is supposed to have caused typhoid fever. (3) That the bacillus will give rise to a toxic poison which rapidly proves fatal in certain animals with symptoms similar to those produced by the Eberth bacillus. As regards the first, although under certain conditions the bacillus coli communis will grow and move in a similar way to the Eberth bacillus, still, under other conditions, it behaved very differently. I believe it is found that the bacillus coli communis causes sugars to ferment, and consequently milk to clot, whilst the bacillus of Eberth under no circumstances does so. It is not astonishing that the bacillus coli communis should be found in water contaminated by typhoid excreta, for this bacillus swarms in the intestines of typhoid patients. The fact that the bacillus coli communis produces a toxic poison, and is present in such large numbers in the intestines in typhoid fever, makes it not improbable that it may play some part in the causation of the symptoms of that disease. But looking at the matter in the light of every-day experience, I think we shall not conclude that the bacillus coli communis theory is correct. The number of cases that can be traced to previous cases is very considerable, and increases with the care of the investigator. Dr. Porter was able to trace a fair proportion in what must be considered very difficult circumstances. Another result that one would expect if the bacillus of typhoid fever were distributed in all heaps of human excreta is that as soon as the conditions for their growth were present there would be a general epidemic, at any rate, in towns where middens are very common. The chief factor governing their growth would, I suppose, be temperature. But no marked relation between temperature and typhoid fever has been proved similar to that in infantile diarrhœa. As Dr. Porter points out, the cases of typhoid fever seem to be grouped in a marked way round the upper ends of sewers.

It would be interesting to know whether in previous epidemics the same grouping can be traced. The localisation of a single epidemic may be determined by more or less accidental circumstances, such as the position of the initial cases, and the opportunity they may have of directly infecting those in the immediate neighbourhood. In estimating the influence of the sewers, those cases that have been traced to other causes, such as middens and milk supply, should, I think, be eliminated. The fact that 44 cases were traced, or believed to be traced, to infected middens is extremely important when one considers how difficult it often is to trace these cases, and that probably there would be a considerable number due to the same source untraced. The question of who should bear the cost of conversion of middens was raised. I should think, certainly as regards such middens as Dr. Porter described, the owner ought to bear the expense. They are not only bad because they are middens, but they are extremely imperfect ones, and would cost probably as much to make perfect as to convert into water-closets. If, however, the owner has already been compelled to convert the closets from one system to another, the cost of a second conversion should certainly be borne by the Corporation. The sewers which are unsuitable for water-closet sewage will no doubt be also unsuitable for the present sewage. Conversion of middens should go hand in hand with placing inspection chambers in the sewers, careful inspection of sewers, and testing of the drains. In this way no doubt it will be a means of hastening a reform in the sewers themselves. If all house drains are cut off from the sewer by means of a Buchan's trap some special means of ventilation of the sewer should be provided, otherwise the ventilation is made much worse. In Blackburn, and probably in many other towns, it has been the custom to run the rain-water pipes directly into the sewer, and although this has certain dangers of its own it certainly ventilates the sewer well, and if it is done away with some other ventilation should be provided. The water test should, in my opinion, be used on all new drains. It is a severe test, but by no means too severe for drains which probably will not be touched for ten or twenty years or more. The drains should be so arranged that the water test can be put on at any future time. The smoke test is undoubtedly useful, but for my own part I never feel certain after it has been applied and no defects found that the drains are all right. I consider the regular collection of typhoid excreta in air-tight pails a very important preventive measure. In Blackburn this is done daily. In order that the pails may be absolutely cleared I have had them enamelled on the inside. The excreta is burnt at the refuse destructor. As most towns either have, or soon will have, refuse destructors, there is not often any need for special sterilisers or incinerators.

Dr. VACHER congratulated the reader of the paper on his important contribution to the aetiology of typhoid fever. Dr. Porter had carefully studied the incidence of the disease, and advanced suggestions that would be most useful to any medical officer of health having to investigate a widespread outbreak of the same disease in an urban district. It is pointed out first that the town in which the outbreak occurs is one in which typhoid fever (for at least ten years before) has been endemic, and that the actual outbreak commenced in the latter half of June, 1893. Thus it is not a question of how the disease was imported into the locality, but how it was spread. The spot map shows a remarkable grouping of the cases in the vicinity of the highest points of certain of the main sewers, where ventilators were situated, which would mainly act as air outlets. Moreover, a larger number of complaints of effluvia from sewer ventilators had been received. Further, when the outbreak occurred a prolonged drought, followed by a spell of hot weather, diminished the self-cleansing powers of the sewers and favoured the development of enteric fever poison. It is inferred therefore that noxious vapours from the high-level sewer ventilators were the media by which the infectious material was conveyed to many. The disease was also spread (according to the second theory advanced) by means of the emanations from a polluted soil. It appears that in the higher parts of the town, some distance from the river, the clay is superficial, while in the valley this lies under sand and gravel, which is capable of retaining leakage from drains and middens. Owing to the long drought this was not cleansed as it would be ordinarily by the ground-water; and the three areas of special incidence of the fever were just above the escarpment of the valley, the houses and middensteads being built on and in the sand and gravel. As the probability of the disease being communicated in drinking water was considered and dismissed, and the probability of its being conveyed by milk (except in one instance) was unsupported by evidence, there seems little room to doubt that what spread the disease was specifically polluted air from ground and sewers. Seeing that the result of so many investigations has been to show that the typhoid bacilli had come to the patient in water or milk, it is well to be reminded they may sometimes come to him with the air he breathes. As regards Dr. Porter's recommendations to his Sanitary Committee, they are generally admirable. The only one I cannot endorse is recommendation No. 3 If, as I assume, the sewers of Stockport are now fairly well designed and constructed, and provision is made for flushing, and the flushing is done systematically, the construction at various points of steep gradients, tumbling-bays, etc, will not be required I would suggest that the completion of the intercepting sewer should be at once taken in hand, so that the conversion of privy-middens into w.c.'s, etc., may be at once proceeded with. There is nothing to prevent the Sanitary Authority becoming responsible for a portion of the necessary outlay. Meanwhile, privy-middens which have to be emptied through the dwelling-houses should be got rid of in some way, and the privy-midden used by the occupants of 14 houses—I hope there is not more than one such receptacle—should be promptly superseded.

Dr. SERGEANT pointed out that it was not easy to obtain the consent of house owners to the proposed upcasts. Indeed, neither tenants nor owners liked having sewer ventilators built up their houses. Assent must be first obtained and provision made for these upcasts before any street openings were closed. It might even be better to leave the street openings after the upcasts were fixed. Whenever there is an effluvium from the street ventilators, the sewers should be promptly examined—some cause will be found. Usually the cause is a deposit. It was not only necessary that sewers should be properly constructed; they should be systematically inspected. Special inspectors should be appointed for the work. As regarded the important question whether the entire cost of conversion should fall on the owner, the speaker thought that if the authority had previously required a change, then part of the conversion should be paid for. Authorities should not require conversion except for the abatement of a specific nuisance in each case. Attempting to get the sanitary accommodation of whole streets of houses changed from privy-middens to w.c.'s had been from time to time attempted (as at Stretford lately) without success. As to collecting infected excreta, it was quite proper that the sanitary authority should undertake this task. The stuff should be properly disinfected—preferably burnt. The old way of dealing with it, which used to be adopted in infectious hospitals—burying it in holes in the ground—was not a practice to be commended.

Dr. HOPE could not imagine a more important subject for discussion than typhoid fever, because it occurred in towns and rural districts in which every known system of dealing with excreta was adopted. Much had been effected in the way of conversions in Liverpool—till a few years ago largely a midden town—but the authority had paid no part of the cost. Of course, in equity an authority ought to pay if after ordering one alteration it was dissatisfied and ordered another. As to sewering, it was mainly an engineer's question. However, the health officer had to see that there were no sewers of deposit, that there were arrangements for flushing, and that flushing was properly done, and that ventilation was amply provided for. Of course ever

house should be efficiently cut off from the sewer. In investigating typhoid fever the inquiry was nearly always how it spread rather than how it generated.

Dr. NIVEN said that as Eberth's bacillus did not appear till the ninth day the authority were pretty safe in collecting the excreta and burning it from the day the disease was notified. In Oldham the infectious excreta from reported cases and fever hospitals had been collected and cremated, since this way of dealing with the excreta had been suggested to the speaker by Dr. Sergeant. It was probable that the disease had spread at Stockport in the way suggested; still it was quite possible the water had some share in the matter. As to etiology, it is most certain that Eberth's bacillus is the cause of typhoid, still, the contagium is doubtless a specific thing. Budd's investigations were of great value.

Dr. ROBERTSON said that in St. Helens it had been shown that there were four times as many cases of typhoid fever in houses having midden privies as there were in houses having W.C.'s or pail closets. The cases were also more frequently fatal in the privy-midden houses. The privy-middens most needing conversion were those in close proximity to houses. The question of cost would have to be settled in each town. In certain circumstances it was only just that the authority should bear part of the cost.

The PRESIDENT said: Having, at our last meeting, indicated in some measure the lines upon which it appeared to me that discussion on Dr. Porter's excellent paper would prove most useful, it is not my intention to do more now than add a few words on the question of the abolition of midden-privies in urban districts. It is hardly necessary to adduce instances of enteric fever having been spread by means of midden-privies which had been specifically contaminated by the excreta of persons suffering from the disease. Dr. Porter has, however, given some interesting examples of the spread of the disease through the medium of midden-privies used in common. He practically invites discussion as to what in this matter is to be done; by what the midden-privies are to be replaced, and at whose cost. I am in hearty agreement with the spirit of his final recommendation, and have in my own borough succeeded in putting an end to the erection of any new privy, and in getting into force a regulation that privies which require structural alteration can only be replaced by water-closets. In 1890, under these conditions, I secured 653 new water-closets; in 1891, a total of 1,009; and, in 1892, a total of 740. This work proceeds quietly and steadily, and I do not see why it should not be equally successful in Stockport. We have not had to go before the magistrates for an order for conversion more than half-a-dozen times. And now I come to the question of cost. So far, in Salford, this has been borne by the property owners, except in one or two special instances. I think that when conversion is required, in consequence of a nuisance arising from a privy, that the owner should, as a matter of course, be called on to pay for it. If a wholesale conversion of a system be contemplated in a district I think that a part of the expense should be borne by the general district rate. But my strong opinion is that the borough or district funds should not be drawn on, or a general conversion be instituted, until the bulk of insanitary privies have been dealt with as effectual nuisances—nuisances which the public would not dispute. In other words, whatever scheme of conversion be adopted, I think that the greatest care should be taken to saddle the right shoulders with the cost, and to avoid saving the pockets of negligent property-owners at the expense of those who do their duty and act up to their individual responsibilities.

In reply, Dr. PORTER said: When, at Dr. Vacher's suggestion, I undertook to prepare a paper on the outbreak of typhoid fever in Stockport, I determined to try to set specially before you some of the practical difficulties in the way of sanitary reform which the Health Committees of old towns have to face, more especially with regard to and effecting reformation and improvement in their method of excrement disposal, and my object in doing so was to invite expressions of opinion from other members who have these difficulties to face every day. The instructive discussion which my paper has evoked has therefore been a source of gratification and profit to me. The experience of other towns with regard to the question of municipal assistance in the conversion of privies to water-closets has been of special interest. Personally, I am hardly able to agree with the opinion expressed by several members that no municipal help should be given, at any rate as regards Stockport, where the enormous size of the old middens was, I am informed, insisted upon by the Corporation in former years. They have now awakened to the existence of the evil for which their predecessors are responsible, and I think it only equitable that in such cases the Corporation should bear part of the cost of conversion. The arrangement referred to by Dr. Sergeant, as adopted at Accrington, whereby the Corporation pay the whole cost of transformation of privies which are not a nuisance, and £2 towards cost in all other cases, appears to me to be a fair one. A proportionate allowance on the total cost certainly appears to be open to the objection, indicated by Dr. Kenyon, that by a little financial juggling between the builder and property owner the Corporation's contribution might be made to cover the whole cost. With reference to the important question of testing covered drains, I am entirely unable to agree with the high opinion expressed by Dr. Littlejohn as regards the value of the smoke test. Since our last meeting I have been in communication with Mr. de Courcy Meade, whose Report I quoted from, and he writes me: "From the experience of upwards of twenty years I may say that I have found in numerous cases that drains which appeared sound with the smoke test were, when opened, actually in a most defective condition. The daily reports of my inspectors bear this out to the fullest extent. Drains are made to convey liquid, not smoke, and when submitted to the hydraulic test have to withstand a pressure equal to that which would be brought to bear in the event of the drain becoming choked at the outlet. The pressure with the smoke test, as usually applied, is practically *nil*. It is not sufficient to unseal the 1½in. or 2in. water seals of the closets. How can it, therefore, be accounted a satisfactory test for the underground drain?" I would ask gentlemen who pin their faith to the smoke test, whether after applying the smoke test and failing to detect any defect, they have thereupon applied the water test to the same drain, and if so, with what result? If they have not done so, they are clearly not entitled to express an opinion on a point as regards which they are without practical experience. As regards the bacteriology of typhoid, I am aware of its unsettled aspect, and partly perhaps for that reason feel disposed to regard MM. Rodet and Roux's view as a very acceptable explanation of those isolated cases of typhoid fever which occasionally arise and which conscientious investigation fails to connect with previous occurrences. As regards the question of the direct contagiousness of typhoid, referred to by Dr. Kenyon, I have not yet been able to detect any such occurrence, and am inclined to believe that many of the cases attributed to this cause are produced by infected lineo In reference to Dr. Anderson's request for more information as to the state of the sewers in Stockport, I may say that the number of road ventilators is relatively very small, and till recently there were no shaft ventilators. A quite exceptional number of complaints of foul emanations from these street ventilators was received and verified, and this I regarded as indisputable evidence of decomposing deposit somewhere in the sewer beneath. I do not quite understand the ground of Dr. Vacher's objection to tumbling bays, for without some such provision for steep gradient sewers I do not see how it is possible to effectually guard against the escape of sewer air at the highest level of the sewered district. The employment of special sewer inspectors is a desirable but, I fear, in Stockport at any rate, a very unlikely refinement of sanitary administration. In reply to Dr. Niven's suggestion that the water supply may have been polluted by defects in the mains, I may say that special inquiry was directed to this point, but nothing to support this theory could be detected. Other features of the out-

break were also against this view. From a consideration of what we know as to the seasonal prevalence of typhoid, I cannot agree with Dr. Niven that the meteorological conditions of the past summer were causally unassociated with the outbreak. In conclusion, I must again thank the branch for the kind consideration they have been good enough to give to the subject I have attempted to bring before them.

The PRESIDENT then called on Dr. Jordan to read his paper :—

INFECTIVE SORE THROAT OR DIPHTHEROID, OR DIPHTHERIA.

By F. W. JORDAN, M.R.C.S., D.S.Sc., M.O.H. for Heaton Norris.

The particular point I wish to bring before the Society of Medical Officers of Health is that many sore throats which are looked upon as quite harmless and of no serious importance are, in my opinion, mild forms of diphtheria. I base this conclusion on my own experience, and on the experiments of MM. Roux and Yersin, reported in the Society's Journal, Volume III.

But I do not wish to confine myself to this one point; I shall refer to the prophylaxis of this class of illness, viz., drainage, etc.

Diphtheria, until recently, was considered to exist only when the patient had thick membranes in the fauces, swollen glands in the neck, and great prostration; that is to say, the disease in its typical form, when death nearly always results. The milder form of the disease to which I am referring was spoken of under various names, oftenest ulcerated sore throat or simply sore throat, and sometimes in severer forms as diphtheritic sore throat. I have never found that the use of this specific adjective made any serious impression—it does not convey the idea of infection, though it ought to do. A fuller explanation of one's meaning is necessary for this purpose. People rather pooh pooh isolation and other precautions for this complaint, though I remember an old lady who, when I was a boy, looked upon all sore throats as more or less infectious. My attention was drawn to this subject during an epidemic of diphtheria in Heaton Chapel in 1882-3. Many cases occurred of a typical character, and associated with them—either in the same families or separately—were many cases such as I am alluding to, where the symptoms were so slight that I should hardly have diagnosed them as diphtheria at a non-epidemic period. These cases were infectious, and I found that this mild form could give rise to a severer attack in other persons, and to sequelæ that one usually meets with in regular diphtheria, such as nervous symptoms, enlarged glands, subsequent prostration and weakness, and even albuminuria. Dr. William Robinson, in the section of Public Medicine at Newcastle in August, 1893, relates a case of sore throat without any false membrane, followed by paralysis of ciliary, palate, and other muscles, showing the case to be one of diphtheria. Dr. Thorne Thorne says in his work on "Diphtheria: Its Natural History and Prevention," "that prevalences of recognised diphtheria are commonly associated in their beginnings, during their continuance, and after their apparent cessation with a large amount of ill-defined throat illness"; and "that certain forms of sore throat, clinically undistinguishable from the rest, are in all probability slight forms of diphtheria; and, further, that all forms of sore throat, infectious or otherwise, afford a congenial nidus for diphtheria, and bring about abnormal susceptibility."

It is characteristic of all epidemics that the cases shall vary in severity, this variation depending on virulence of the poison and the tissue resistance of the patient; and, as in other infectious diseases, the mildness of the symptoms is a source of danger to the community, for unless the disease is recognised early, other members of the family are sure to suffer. Fortunately, the correct treatment is a safeguard to others, as well as a cure for the patient, the secretions from the throat being disinfected almost as soon as they are formed.

Dr. B. Collins, in the *British Medical Journal* for September 23rd, 1893, gives a table of these mild cases occurring during an epidemic of diphtheria, only the virulent cases being notified, and these were associated with defective drainage; and that these cases are serious is shown by the fact that of 13 cases (unnotified) one died.

The investigations of MM. Roux and Yersin show that this disease may depend on the presence of pseudo-diphtheritic bacilli even when the specific bacillus is not present, and that as this false bacillus, or as some believe, attenuated bacillus may recover its virulence, it is important to practise antiseptic treatment of the throat from the commencement. These gentlemen ask the question, "Is there any relationship between the two (viz., the true and the false diphtheritic bacilli)?" The presence in healthy mouths, and in the mouths of those with non-diphtheritic sore throats, precludes this. On the other hand, if the non-virulent bacillus is very rare in fatal diphtheria, and becomes more common as severe cases progress towards recovery, and that they are more numerous in those who have just had diphtheria than in healthy persons, it is difficult to consider the two microbes absolute strangers to each other.

These cases ought to be reported to the medical officer of health—but under what name?—one cannot call them diphtheria without due explanation of one's meaning in order to avoid giving alarm (though they would be classified under that heading). Infectious sore throat correctly describes them, but this name is cumbersome; diphtheritic sore throat is open to the same objection; diphtheroid is better, that is, like diphtheria. The disease generally exists where diphtheria or scarlet fever is prevalent, or where health conditions are unfavourable, and can be recognised without great difficulty. The cardinal signs in my experience

are dusky redness of fauces and diffused over the surface of the tonsils, pharynx, uvula, and sometimes soft palate, and on the margins of this part the diffused redness may be spotty; there is fever, malaise, and after the disease has lasted a few days anæmia, sometimes a slight enlargement of a gland at one or both angles of the lower jaw; the tonsils may enlarge and the pharyngeal mucous membrane may swell and cause excessive secretion here, with all its usual inconveniences and sequelæ. Of course, one may mistake a harmless sore throat for this serious disease; in this latter other members of the family are sure to suffer, which will render the diagnosis no longer doubtful. In the more simple disorder the symptoms are more acute, and the disease more painful and rapid in its course. The truly scientific way of arriving at a decision is inoperative as regards a practising medical man; I mean cultivation of the bacillary elements of the secretion from the throat. But with the symptoms such as I have described it would be the safer plan to look upon the disease as infectious, and treat it as such.

We may remember, however, that in epidemic influenza, for instance, a false membrane occasionally forms on the throat. And MM. Roux and Yersin and others have shown that false membranes in the throat may originate in the streptococcus pyogenes without containing a trace of the diphtheritic bacillus, but apparently the only definite way of proving the specificity of the organisms found is by experiment on animals. An examination of the bacilli by microscopic examination is not conclusive, as the difference between true and false diphtheritic bacilli is not clear, and the same is to be said of cultivation. Roux and Yersin say that in every case in which there is a notable number of colonies diphtheria may be concluded, but proof can only be obtained by inoculation in animals; in the case of false diphtheritic bacilli there is no result, in the true the disease is produced. The morphological differences are too feeble to prove anything, they can only be distinguished by their action on animals. A medical man must rely on his judgment and experience in order to arrive at a correct diagnosis. One important point about these cases as well, as in true diphtheria is, when may it be considered that infectiveness has ceased? Escherick found the specific bacilli in the mouth three days after the false membrane had disappeared, and Roux and Yersin eleven days, and in one case fourteen days after.

In practice I do not consider the patient safe from infecting others until all trace of abnormal redness has disappeared from the throat, but some judgment is required to be brought into play here, as some cases leave subacute pharyngitis behind which may become chronic. If there is much tumefaction of the mucous membrane I recommend continuance of mild specific treatment for some time longer after the acute symptoms have passed away, and isolation as far as possible. As long as there is any pain or tenderness of glands about the angles of the jaw, or until the enlargement of them subsides, I consider there is infection, as there may be some diseased patch still existing in some out of the way pocket in the mucous membrane behind the tonsils.

With regard to the etiology of this mild form of diphtheria, Dr. Eustace Hill (see section of "Public Medicine at Newcastle," *British Medical Journal*, August 19th, 1893) says: "Defects of sewerage and drainage, and accumulation of decomposing filth also seemed to favour the disease, and it was a well-known fact that the prevalence of diphtheria in many districts dated from the time of the completion of schemes of sewerage and drainage."

Dr. Alfred Hill said at the same meeting "that this was due to disturbance of soil and not to the sewers, because it was found by experience that when the sewers were got into working order the diphtheria disappeared." I question this myself.

Dr. Davies, of Plumstead, and Dr. Jones brought forward evidence to show that the street sewer-grids have a causal connection with diphtheria. Dr. Davies quotes Dr. Seaton, referring to a Surrey village where there was an outbreak of diphtheria immediately after a perfect system of sewers had been put in. Dr. Seaton gives this as an instance in favour of his view that diphtheria was independent of sanitation; but as the sewers were ventilated in the orthodox manner—that is, by grids—Dr. Davies adduces this in support of the opposite opinion. Bristol had unventilated sewers and very little diphtheria.

I find in most cases of diphtheroid that there are defective drains to account for the illness. I can recall a case where a family of children were ailing, but not seriously, with sore throats. The clinical appearances pointed to defective drains. Some repairs were done, and the cases recovered. Some months afterwards a fresh case occurred in the same family of diphtheroid. A fresh examination of the drains was made, and a most serious defect was discovered in the cellar. Curing this defect had a remarkably good effect on the health of all the children.

One of the reasons that a new system of sewerage is sometimes followed by an outbreak of diphtheria is that the old fittings of the drains are imperfect and are unfit to cope with the large quantity of sewer gas to which they are exposed under the new conditions.

Disturbance of soil could only be charged with an outbreak of disease if that soil contained a large quantity of decomposable matter such as the contents of ashpits or the soil of a graveyard

There are three things requisite in a perfect system of house drainage, viz. :—

1. A well-arranged system.

2. Close supervision of the work to insure it being properly carried out.

3. A method of securing the accomplishment of 1 and 2.

I need not go into the details of the first necessity.

As regards No. 2 the details of the work should be watched carefully by a trustworthy person, for I consider this part of house construction the most important part on account of hidden dangers quite beyond our knowledge or control after the work is finished. The drain ought not to be covered in until it has been inspected and tested by the sanitary authority. This brings me to my third point, that after this has been done the sanitary authority might, without incurring any responsibility, give a certificate to say that the drainage is satisfactory on that particular date. This proposal was suggested by me in a paper I brought before this Society some years ago, see PUBLIC HEALTH, Vol. I., page 292. In this way tenants would be protected against speculating landlords, and landlords would be protected against unprincipled builders.

Dr. R. Dudfield has referred to the same idea in a paper he read before the Parent Society on February 20th last, wherein he describes the system in force in Eastbourne. But whereas in that town a certificate is granted only in respect of houses and hotels rented at £50 and upwards I would have them granted in respect of all houses where there are drains, and I quite agree with him when he says "that the sanitary authority should alone grant certificates, and not accept them from irresponsible persons." In discussing Dr. Dudfield's paper Professor Corfield brought forward the same argument that was employed in the discussion of my paper, viz., that in case of an infectious disease arising in a certificated house an expert might discover some defect in the drains which would make the sanitary authority responsible. This contingency is provided for by the certificate being legally applicable only for a particular date.

I have long thought that some such plan as this is particularly necessary for schools, especially boarding schools. No house ought to be allowed to receive people's children for residence, nor hotels either, without some guarantee that the sanitary arrangements are satisfactory. At present our only guarantee is self-interest, and that I take it is not sufficient to prevent occasional cases of serious damage to health from defective drains. These remarks apply with especial force to lodging-houses. We all know what a great number of serious cases of illness arise at seaside resorts among visitors, who are admitted into houses whose sanitary arrangements are anything but perfect. I think it scandalous that people should be allowed to take in lodgers and allow them to contract diseases without being liable to a penalty.

I would just like to refer to a statement I saw the other day that Dr. Jenner had said that diphtheria was not entirely due to insanitary conditions, because it was a disease more common among the rich than among the poor. If it be true that infectious sore throat is less common among the poor, I should explain it by the fact that the poor have no drains in direct connection with their cottages; no w.c.'s and no ill-fitted lavatories and baths; that they live more in the open air than do the rich; and that the houses of the poor have the street door opening direct into the dwelling-room nearly always open, and so foul air becomes rapidly diluted and removes the evil effects of some of the insanitary conditions in which the poor live.

The three points I wish to press and on which I am desirous of an expression of opinion from the Society are :—

1. That diphtheroid is practically diphtheria, and should be reported under that heading until a new term to include this disease is added to the list of notifiable diseases.

2. That some method of compulsion should be adopted by sanitary authorities to secure the efficient drainage of every new house—either the plans I have suggested or some other that will be equally efficacious.

3. That it should be compulsory for hotels, hydropathic institutions, boarding houses, lodging houses, and day and boarding schools to have a certificate of satisfactory sanitary arrangements and fitness for their several purposes from the local authority, to be renewed annually.

DISCUSSION.

The PRESIDENT remarked that the subject selected by Dr. Jordan was in one respect at least related to Dr. Porter's subject—both typhoid fever and diphtheria appeared to be often the result of defective drains. The main question raised was whether the infective sore throat or diphtheroid is to be regarded as true diphtheria. The propriety of giving certificates to houses had been considered by the branch last May, when the Sanitary Registration Bill was under discussion.

Dr. HOPE said that in the Liverpool Infectious Hospital a considerable number of cases of sore throat were sent in as diphtheria, and yet developed no further symptoms. At the same time quite light cases that seemed unimportant afterwards manifested diphtheritic paralysis, thus placing beyond doubt the nature of the disease. There was often great difficulty in distinguishing cases of diphtheria in an early stage of the disease.

Dr. ROBERTSON thought that an explanation of the difference in the severity of diphtheria in different cases was the difference in the virulence of the organism. The organism can be attenuated in the laboratory—it might be sometimes attenuated by nature. It was important to remember that the bacillus of the disease had been found in throats in which no false membrane was visible. The inflammation set up might be catarrhal instead of croupous. It was well known that epidemics were often preceded by cases of diphtheroid.

Dr. NIVEN said the practical point was, should all cases of sore throat be reported? There would be some difficulty in requiring this. If there were none of the usual symptoms of diphtheria why report the case? Whether the case was a proper one to notify or not must be left to the judgment of the practitioner. The speaker agreed with Dr. Jordan that the house drains should be examined with the water

test; but he thought it would not be wise for the Sanitary Authority to commit itself by giving sanitary certificates in respect of houses.

Dr. ANDERSON said that the question whether there was a connection between diphtheria and defective drainage had been lately fully debated in the *British Medical Journal*. He was of opinion that certifying houses was not advisable. The experience of Blackpool in doing this, in years past, had been unfortunate. It was right for the authority to certify that a new house was fit for habitation—to do more than this would be unwise. It was a question that was often suggested, whether membranous croup should not be called diphtheria.

Dr. SERGEANT expressed a doubt whether authorities should pay for more information of sore throat. Many of them would object to do so. Medical practitioners might be trusted to notify what they regarded as diphtheria. A similar question had arisen with reference to the propriety of requiring varicella to be notified.

Dr. JORDAN briefly replied. He said that many seemed to agree with him as to the great difficulty of distinguishing some cases of severe sore throat from diphtheria. Dr. Robertson's evidence that the organism of diphtheria was found in cases in which no false membrane could be seen supported the views he had set forth. He could not see what risk there would be in granting certificates such as those proposed in his paper. Every certificate would bear on its face the date on which it was granted.

Dr. SERGEANT proposed that PUBLIC HEALTH should be supplied to the Chemical Club, in whose rooms the branch met. This was seconded by the President, who said the branch might well incur this trifling charge, in courtesy to the Chemical Club, and it was resolved accordingly.

(End of Proceedings of the Incorporated Society of Medical Officers of Health.)

CASE OF MORTALITY FROM DIPHTHERIA IN LONDON.—During 1892 the number of cases of diphtheria notified in London was 7,781. Of this number 2,009 were admitted to the Asylums Board hospitals. The percentage of deaths and number treated was 29·1 in hospital experience, 22·5 in cases treated at home. On this point the remarks of Dr. Gayton, the medical superintendent of the North-Western Hospital, are of interest:—

The observations and the facts as to the large number of fatalities occurring within a few hours after admission have not received as yet a sufficiently prominent attention. Thus, in the course of the past year no less than 18 scarlet fever patients and 36 suffering from diphtheria passed away in periods varying from two to 30 hours after their arrival, which, subtracted, would reduce the mortality to 5·63 per cent. and 16·61 per cent. respectively. The conclusion forced upon us is, and the inference must necessarily be, that either sufficient care is not always exercised in regard to the condition of cases for removal, or that the transfer is sometimes postponed until the state of the patient is hopeless. As regards the latter, it is by no means an isolated circumstance to receive a child with a report from the ambulance nurse that the medical man from whose care it has come is of opinion that tracheotomy is imperatively required, which, being done *in extremis*, goes, as a rule, to add to the already too many failures attendant upon the operation. That these unfortunate events will continue to recur is undoubtedly certain; nevertheless, they render the death-rates, calculated on mere numbers of so-called patients, utterly worthless as measures of hospital non-success.

REPORTS OF MEDICAL OFFICERS OF HEALTH.

By LOVELL DRAGE, M.A., M.D.Oxon.

THE exact information as to the substance of the reports is fully laid down in the Local Government Board's orders, but no precise regulations can procure a supply of reports which can be of general utility.

I propose to consider briefly the points to which attention should be paid in writing a report which will be of use to the general community at large as well as to scientists.

At the present time it can scarcely be stated that medical officers of healths' reports are prepared in such a way as to show that the function of mental digestion has proceeded satisfactorily or at all in the brain of many of the writers. Without such digestion reports cannot be of general utility. The average reader cannot wade through pages of statistics and official information, but he can read, and will read, simple digests of the matters of importance.

It is a matter of some moment that the public mind should be properly educated in matters with which medical officers of healths' reports deal. If intelligent interest can be aroused in the various problems connected with epidemic diseases and sanitation, the following good results, amongst others, will appear in course of time:—

1. The community will be better able to distinguish a man (whether he has the mystic letters D.P.H. after his name or not) who does not know his work and one who does.

It is a matter of some ease to prepare a report which will comply with official regulations; but it is not so easy to prepare a report which shows mental digestion and assimilation, and it is impossible to prepare one for general readers if these functions are not encouraged.

2. The community will be better able to appreciate the opinion and advice given by doctors in points connected with sanitation and epidemic disease.

3. It will be much more easy for doctors to practise on scientific principles if the community has correct ideas, however rudimentary, instilled into its mind; and it will not tolerate the practice of men who, for instance, neglect to base their opinions on ascertained facts

It should be a matter of everyday knowledge that epidemic diseases vary in duration of attack and in severity and kind of symptom; also that one epidemic disease may have the closest affinity with others. I believe it is of advantage to go pretty fully into the theories connected with causation, and simplicity of term should be carefully adhered to in doing this, as it should be throughout a report. It is not a rare occurrence to hear the law laid down, say, on the subject of enteric fever, by persons not ignorant but badly instructed. Such people will say that a patient cannot have had enteric fever because the temperature descended to normal in the second week, they cannot

understand, from want of correct teaching, that there are few diseases which show greater variation. Again, a mortal panic is apt to spread in a locality when an epidemic breaks out. These panics are not so much the result of unreasoning fear as of ignorance.

It is therefore, I take it, one of the duties (unwritten) of the medical officer of health to educate the public mind. If he is careful in language he need not be afraid of discussing theories and recording facts which he has noticed in his district in the year which tend to prove or disprove current theories connected with diseases which have been prevalent. He may even propound theories of his own based upon facts which he has observed, and in this way he will often obtain a wider circle of readers than he would if he adheres closely to the official track. Having prepared the mind of his readers, he can the more satisfactorily point the moral; he can connect, as there is occasion, faults of sanitation with the diseases, and show how improvement can be made.

In dealing with sanitary improvements care should be taken to give an idea of the reasons which prompt the recommendation, and every pains should be taken that remarks should be anticipated from the interested and bigoted. Such remarks conform to a stereotyped standard, they are all directed to show that no sensible person could suppose that the improvement suggested is either desirable or calculated to promote the well-being of the community.

There is a tendency at the present day, and I believe it to be a tendency which would be obviated if more care were taken by medical officers of health. It is the tendency to attribute all diseases of zymotic type to faults in the arrangement and construction of drains.

Do not think that I wish to minimise the prime necessity of careful attention to drainage arrangements, but the following state of affairs is not of unfrequent occurrence.

There is a case of zymotic disease in the house, the first thing examined is the drainage system. Sanitary experts can and do usually find a defect. The disease is immediately attributed to this, although there may be no evidence at all to show that the disease can be properly attributed to sewer poisoning.

The result of this tendency is that many people of an intelligent frame of mind become disgusted with the way in which sanitary questions are dealt with. They see that there is a fault in the reasoning which connects so many diseases which present the most diverse symptoms with one particular condition.

It is not too much to say that at the threshold as we are of a difficult subject, it is of the utmost importance not to take any but the most wide views as to the causation of zymotic disease. To connect all sorts of zymosis with the poisonous emanations from drains is calculated to bring the whole of sanitary science into disrepute, and to put back instead of forwarding the science of public health. Few diseases I suppose are so little understood as diphtheria. It is generally accepted by the public that sanitarians look upon it as a drain disease. When an epidemic occurs in a purely agricultural district, this theory being at once at fault, the sceptical seize the opportunity of laughing at the sanitarian. But I think I have said enough of the necessity of taking a wide view in dealing with the causation of zymotic diseases and taking pains of acquainting the public with the various conditions which lead up to an epidemic.

The next point I desire to call attention to is this. There is no doubt that sanitary improvements are annually placing a very hard task on the ratepaying part of the community. It is very undesirable that any scheme should be recommended in reports which are not of primary importance. Schemes for which the writer cannot show the necessity and utility are better kept at home. It is quite certain that in the long run the community will kick at expensive schemes when they can get on very well without them.

This leads up to the question of infectious hospitals. Medical officers are not unlikely to magnify the necessity for these; I have done so myself. At the present time I withhold my opinion. The question is one of great difficulty, but I am inclined to think that their utility in the direction of checking the prevalence of zymotic disease is over-estimated. I am not aware that the very liberal supply of these institutions has checked the amount of zymotic disease or the death-rate from it in the metropolitan area Under these circumstances I counsel very great diffidence on the part of medical officers in dealing with the subject, which opens up the very large question of the effect of herding together a large number of zymotic patients.

Another question of importance and, I believe, of the highest, is that of overcrowding. In country districts it is a matter of frequent observation that the provision of three bed-roomed cottages does not tend to diminish overcrowding. It does not do so because three or four lodgers are taken in, and the children and parents sleep in one room, as they would in the case of a cottage with one room. Strong steps should be urged on sanitary authorities to prevent this. The matter, however, requires delicate treatment, for when the accommodation is insufficient for the needs of the inhabitants great hardships are sometimes the result of too active an interference. The provision of a better class of a house then may promote the evils which it is intended it should diminish. In connection with this subject full information should be given of the results of overcrowding, and a great deal of useful elementary scientific information may I think be given with great advantage. I mentioned statistics cursorily at the commencement, elaborate

tables are no doubt useful, but it would be an advantage if all but the simplest, such as those enjoyed by the Local Government Board order, should be omitted. The subject can only be dealt with satisfactorily on a large scale, and can be much better dealt with by the officials at Somerset House than by officers in charge of small areas. The simple statistics which are given, such as those connected with deaths, births, and zymotic diseases, should be used, if possible, to bring out salient features connected with the health of the district. Having dealt with shortly the various points to be brought before you for discussion to-night connected with the report as an educational instrument and as an instrument for giving advice on some sanitary measures, the routine statements must be considered.

In districts where the inspector of nuisances is a fairly capable man, the report as to the sanitary work done in the year ought to be dealt with separately by him so far as detail goes. But the medical officer ought to draw attention to the effect of the different measures taken on the health of the district as he finds opportunity. It is perhaps the most telling way of closing the mouths of those who so often attribute epidemics to new-fangled sanitary methods. It is not very interesting for general readers to have to wade through a considerable mass of information as to the number of cesspools cleaned out, etc., and therefore these facts are better kept out of the body of the report.

It will be gathered from what has preceded that the view taken has been that these reports should be educational so far as it is possible to make them; that attempts should be made to keep the community abreast with scientific theories of the day; that so far as recommendations are concerned care should be taken to show the facts and theories upon which they are based, and that some attention should be paid to the cost which recommendations are likely to entail upon the ratepayers of the district; and that recommendations, and especially those in connection with expensive improvements, should be avoided unless it is tolerably certain that benefit will result in proportion to the cost.

At present I have said nothing about the susceptibilities of doctors practising in the district. At the present time, when matters connected with zymosis are very far from being in a settled state, it is a matter of great difficulty for a medical officer of health to steer clear of giving offence, and at the same time to fulfil conscientiously the duties of his post. It has been supposed that if medical officers of health were all debarred from practice and compelled to assume the mystic alphabet of D.P.H. such troubles would cease. Personally I have neglected the attempt to assume these letters, because I do not agree with the principle of forcing special diplomas upon doctors who desire to take special appointments. When a man is licensed he ought to be sufficiently well equipped to be fit to undertatake these duties, and if be is fit to be on the register, he ought to be fit for any duties which may fall to his lot connected with his profession. Although in practice and without the letters I do not myself find any great difficulty in dealing with others. I am unable therefore to think that the trouble will be avoided by legislation. I believe that until doctors as a body cease to look upon patients as private property, and arrive at the conclusion that their opinions are as likely to be wrong as other peoples, the difficulty will remain. It is possible to deal with men who state facts, and their reasoning from these facts, but it is quite impossible to treat with men who say the disease is so and so, and we forbid you to come to any other conclusion but that which we state. Having recently taken great pains to arrive at a conclusion as to an epidemic in my district, I was met the other day by a furious individual (who afterwards admitted that he had only seen two cases), who told me that he should report me to the Local Government Board because I had come to a different conclusion to his own. In reports it is a difficult matter, in dealing with cases with which such men are connected, to avoid giving offence. But so long as a statement of facts and conclusions is adhered to, the duty of a medical officer of health is performed, and can be performed just as well by one competent person as another. The question is really one of education and correct conduct, quite as much on the side of the practising doctors as on the side of medical officers; and I do not think anything is gained by medical officers surrendering their own judgment into the keeping of practising doctors, quite the reverse.

A great deal, I know, is made of the possibility of a medical officer making capital out of his work, and of his differing from the practitioner in charge, simply because the latter is in charge. It appears to me that the race will be to the swiftest; the practitioner has plenty of opportunities of explaining and upholding his diagnosis, and if the medical officer of health is wrong so much the worse for him. I have met medical officers of health outside my district and agreed with them, and I have also met them and disagreed with them, and have been none the worse.

The difficulties, then, connected with reporting upon zymotic diseases will cease when human nature is perfect; no legislative action will cause it to cease. In the meantime the duty of the medical officer is clear. He must report his facts and draw his conclusions from them without bias. If bias can be shown, and if he draws wrong conclusions wilfully, instant removal from his office is the only method of treatment.

Dr. Thresh, in asking me to write on this subject, limited me to ten minutes. I am unwilling, therefore, to trespass further on your forbearance, and hope I have said enough to form a basis for discussion.

Public Health.

POST-SCARLATINAL DIPHTHERIA IN THE METROPOLITAN FEVER HOSPITALS.

THE annual report of the Statistical Committee and the medical superintendents of the Metropolitan Asylums Board contains the following particulars on this important subject.

Dr. Goodall reports that at the Eastern Hospital 23 cases of diphtheria arose among 2,955 convalescent scarlet fever patients. He adds:—

(1) That cases occurred in all the wards and huts except two, one of the old wards and one of the new huts; (2) that case 5 was somewhat doubtful, no membrane was observed during life, and no post-mortem examination was allowed; (3) that both in cases 5 and 7 the patient may have been in the incubation stage of the disease when admitted; and (4) that during the year there were admitted 55 patients suffering from scarlet fever complicated with a condition of the throat that could not clinically be distinguished from diphtheria. This fact may aid in the elucidation of the question of the origin of post-scarlatinal diphtheria.

At the North-Western Hospital, Dr. Gayton reports the occurrence of 25 attacks of diphtheria among 2,670 convalescent scarlet fever patients. He adds the satisfactory statement that compared with former years the incidence of diphtheria as a sequela of scarlet fever is markedly less, though "how or from what causes the improvement has arisen no trustworthy evidence of value is forthcoming."

Dr. Gayton gives the following weighty reasons for not increasing the number of beds for diphtheria at his hospital beyond the present number of 88:—

(*a*) On account of diphtheria patients requiring so large an amount of care and attention that practically a couple of dozen of severe cases demand the almost undivided attention of one medical officer; (*b*) the mental strain arising from the care of many such patients becomes so intensified as to be almost unendurable; and (*c*) because the aggregation of persons suffering from so malignant a disorder, it unduly increased, becomes, in my opinion, an important factor in determining an unfavourable result to a very appreciable degree. To the theory of aërial transmission to other wards I am not, however, a convert, no unequivocal evidence of this having as yet come under my observation.

At the Western Hospital 18 attacks of diphtheria occurred among 1,900 convalescent cases of scarlet fever, and at the South-Eastern Hospital 15 attacks among 2,892 convalescent cases of scarlet fever. No comment is made on these cases.

Dr. Caiger reports that the immunity from secondary diphtheria amongst the scarlet fever convalescents which has hitherto prevailed in the South-Western Hospital has not been maintained, for during the year 18 cases have appeared of which four died. The circumstances under which this serious complication has developed are very striking, and are well worthy of attention.

During the early summer, at a time when there was great stress on the managers' accommodation owing to the prevalence of scarlet fever, I, for the first time, treated 24 patients in a ward which had previously contained 18, although this ward was constructed originally for 24 beds. The floor-space per bed was consequently reduced from 144 square feet, which I regard as the minimum allowable for such cases, to 105 square feet, which the architect, in the case of this block alone, for reasons best known to himself, considered sufficient. Within three weeks from the time of the change, no less than seven cases of diphtheria and three cases of other throat illness appeared in that ward for the first time in its history—at any rate, since the hospital was re-opened in 1889. I therefore on June 22nd removed the six extra beds from the ward, thereby reducing the number of patients again to 18, and increasing the floor space per bed to 144 square feet. At your next meeting I reported to you the action I had taken, which I am glad to say met with your approval. From that date up till the time of writing, a period of nearly nine months, no fresh case has appeared in that ward. Of the other 11 cases, 6 arose in wooden huts, of which the allowance per bed of floor-space was only 100 square feet. This was the first occasion since 1889, from which time my knowledge of the hospital dates, that these huts have continuously contained the number of beds for which they were originally constructed, as I have always considered them unfit for the treatment of the corresponding number of patients. Owing to the continued prevalence of the epidemic, however, it became necessary for a time to receive the full number. Since November last, the prevalence having diminished, the number of patients received into these huts has been gradually lessened, and up to the present time, an interval of four months, only one case has arisen. The remaining five cases occurred in two wards at different intervals spread out in the course of the year.

To sum up the facts associated with the appearance of 19 cases of secondary diphtheria in scarlet fever convalescents from the time of the opening of this hospital in October, 1889, until the end of 1892, it will be seen that no less than 13 cases appeared in rather under 7 months in 3 wards deficient in floor-space per bed, whereas only 6 cases appeared during 44 months in 12 wards which had a sufficient allowance of floor-space per bed.

Although it is doubtless true that other factors are concerned in the development of post-scarlatinal diphtheria in some hospitals, yet, having regard to the long immunity which we have enjoyed, it would seem that such influences are not to any extent operative in this hospital; but that here its incidence has closely followed in the wake of the temporary overcrowding of otherwise healthy wards.

At the Northern Hospital, among 4,666 cases of scarlet fever 28 attacks of diphtheria occurred (omitting attacks occurring within one week of admission). Some significance attaches to the statement that sixteen diphtheria convalescents contracted scarlet fever.

At the Gore Farm Hospital, among 2,867 scarlet fever convalescents admitted between July 3rd and December 31st, there occurred 71 cases of diphtheria, 96 of tonsillitis, and 51 of ulcerative stomatitis. Dr. Matthews adds:—

I have submitted to you, in a special report, the facts which have been elicited relative to the occurrence of diphtheria, and in my opinion these tend to establish that in this hospital the incidence of the disease was correlated to the amount of cubic space allowed to the patient. As soon as the cubic space per head could be effectively increased the disease vanished completely.

THE salary of Dr. Boobbyer, Medical Officer of Health for Nottingham, on the unanimous recommendation of the Health Committee, has been increased from £550 to £650 per annum.

GENERAL MEDICAL COUNCIL'S REGULATIONS FOR DIPLOMAS IN PUBLIC HEALTH.

At the recent meeting of the General Medical Council, Dr. Batty Tuke, of Edinburgh, submitted the report by the Education Committee on the regulations of the licensing bodies granting diplomas in State Medicine. The report stated that in framing recommendations the committee had kept in view the expressed opinion of the Council that diplomas in State Medicine should be evidence of a distinctively high proficiency, scientific and practical, in all the branches of study which concern public health. There was no question of major and minor, higher and lower qualifications in this matter; the examinations of all the bodies must be of high standard. The committee recommended the Council to record its opinion of the absolute necessity, for the public good, that the several examinations of the licensing bodies should be maintained at a high standard; that candidates about whose proficiency any doubt existed should be rejected; and that the principle of compensation (proficiency in one subject being allowed to make up for ignorance in another) should not be admitted. After some discussion, the Council adopted the following as rules they expect to be observed in connection with diplomas in State Medicine "deserving recognition in the Medical Register":—

(1) A period of not less than twelve months shall elapse between the attainment of a registrable qualification in medicine, surgery, and midwifery, and the admission of the candidate to any examination or part thereof for a diploma in sanitary science, public health, or State medicine. (2) Every candidate shall have produced evidence of having attended, after obtaining a registrable qualification, during six months practical instruction in a laboratory or laboratories, British or foreign, approved of by the body granting the qualification in which chemistry, bacteriology, and the pathology of the diseases of animals transmissible to man are taught. (3) Every candidate shall have produced evidence that during a period of six months after obtaining a registrable qualification he has either practically studied the duties of outdoor sanitary work under the medical officer of health of a county or large urban district, or else has himself held an appointment as medical officer of health under conditions not requiring the possession of a special sanitary diploma. The certificate of an assistant officer of health of a county or large urban district may be accepted, provided the medical officer of health of the county or district consents to the assistant officer giving such instruction. (4) Every candidate shall have produced evidence that he has attended the clinical practice of a hospital for infectious disease, recognised by one of the licensing bodies, provided that such a course of instruction may have been taken as part of the curriculum for his registrable qualification in medicine, surgery, and midwifery. (5) Candidates are recommended to avail themselves of practical instruction in the diseases of animals that are transmissible to man. (This regulation is the halting result of the discussion in the Medical Council on the original recommendation of the Education Committee, that "Every candidate shall have produced evidence that he has received practical instruction in those diseases of animals that are transmissible to man.") (6) The examination shall have been conducted by examiner specially qualified; it shall have extended over not less than four days, one of which shall have been devoted to practical work in a laboratory, and one to practical examination in and reporting on subjects which fall within the special outdoor duties of a medical officer of health. The rules as to study shall not apply to (*a*) medical practitioners registered or entitled to be registered on or before January, 1890; (*b*) registered medical practitioners who have for a period of three years held the position of medical officer of health of any county, or to any urban district of more than 20,000 inhabitants, or to any entire rural sanitary district. The Council also agreed that the foregoing rules should apply to all diplomas granted after January, 1894, provided that the rule passed by the Council on June 1st, 1889, and November 25th, 1890, should continue to apply to candidates who had commenced special study in sanitary science prior to January 1st, 1894, and they further agreed to appoint an inspector or inspectors of examination in public health.

AN OUTBREAK OF ENTERIC FEVER IN WEST WORTHING APPARENTLY DUE TO POLLUTION OF WATER MAINS THROUGH THE HYDRANTS.*

By Charles Kelly, M.D., F.R.C.P.,
M.O.H. for West Sussex.

Within the last six or seven months several cases of enteric fever have occurred in the West Ward. The first case was met with in Milton Street as far back as August, 1891; in November, 1891, a pupil at a school was attacked; and in December, 1891, a young man fell ill with the same cause in Brunswick Road; on January 1st, 1892, two fresh cases were reported in Rowland's Road; in the middle of that month two more fell ill in a house in The Parade, and one in Belsize Road; one in Brunswick Road, one more in Milton Street, and one in St. Botolph's Road.

The outbreak then appeared to be over, as no fresh cases were recorded in February. Early in March, however, two fresh cases were recorded in Heene Terrace, one in Manor Road, one in Rowland's Road, and another in Belsize Road, where a previous case was recovering.

The behaviour of the epidemic was unusual, for in most outbreaks the cases follow each other in quick succession, but here were persons falling ill at varying and distant periods of time.

An inquiry was at once made into the water supply, the milk supply, and the drainage.

1. *Water Supply.*—The water is drawn from two wells, whence it is pumped twice a day into tanks in each house; the first pumping begins at half-past six a.m. and ends at eleven a.m., the second pumping begins at two p.m. and ends at five p.m. There is thus a long interval of more than twelve hours between the evening and the morning supply. The wells are so situated as to preclude any chance of pollution, and the water supplied from them has always been of good quality. A sample was sent

* From a report presented to the Sanitary Committee of the Worthing Town Council on March 28th, 1892, and printed in Dr. Kelly's annual report for 1893.

to Dr. Dupré, F.R.S., for analysis on January 14th, and he reports that the water is of high organic purity, and does not show the slightest trace of pollution by sewage.

It has all the characteristics of a very pure chalk water, practically uninfluenced by its proximity to the sea.

It appeared improbable that the water should be impure, because the cases were scattered about the ward, and they broke out at such distant intervals.

2. *Milk Supply.*—An inquiry into the milk supply led to negative results. . .

3 *Drainage and Sewage* —Each house has been inspected, and although here and there a sanitary defect was met with, the drainage on the whole was found to be in good sanitary condition. The tanks receiving the water were clean and, with one exception, the overflow pipes delivered in the open air. Bath pipes, sink pipes (with one exception), and all waste pipes were cut off from direct connection with the drains and ended in the open air. Each house had one or more closets which were flushed from cisterns, which had no connection with the tank, which supplied water for drinking purposes. The soil pipes were ventilated, but in one case the soil pipe was inside the house.

The sanitary surroundings in each case were good. Some of the houses stood in grounds of their own, and all but two were built within the last twenty-five years, most of them having been erected within the last ten years. There was ample air space around each, and there was no accumulation of filth around any of them or any dirty surroundings.

There was no seaweed on the beach, for at this season of the year it is not washed in.

The main sewers were flushed regularly, and they have been kept in clean condition.

Probable Origin of the Outbreak.—A clue to the origin of the outbreak was found when some cases of enteric fever were notified at West Tarring early in the year. West Tarring lies north of the West Ward, and it is separated from it by the Brighton Railway. Just north of the railway, a small suburb of new houses has sprung up within the last seven or eight years.

These houses drain into a sewer which connects with the Worthing system, and this is quite distinct from the sewerage system in the West Ward. The water supply to this new suburb is altogether from the West Worthing Waterworks Company, and this is the only point in common between the West Ward and West Tarring.

If now, the cases of disease in these two places owed a common origin, suspicion must fall on the water supply. But it has been shown that the water, as supplied from the waterworks, was of exceptional quality, and therefore there remained the possibility of subsequent contamination, *i.e.*, some source of pollution on its way from the pumping station to the dwelling house.

The general conformation of the ground is such that a ridge of slight elevation runs from east to west parallel to and south of the railway. Nearly all the houses in the West Ward lie to the south of this gentle slope. All the houses in West Tarring lie to the north of it.

The waterworks are near Heene Terrace, and therefore they are on the southern side. The water mains follow the contour of the surface, so that they rise about sixteen feet when they reach the ridge, and passing over it, they decline slightly as they extend northwards. Upon the course of the mains numerous hydrants are attached. Each hydrant is fixed in a box and covered with an iron lid furnished with a keyhole, and placed so as the upper surface is level with the road. The hydrant consists of a short length of iron pipe connecting with the main below, and closed by a ball of ebonite which, when the pressure of water is sufficient, is forced against a flange of india-rubber, and so the escape of water is prevented.

This is true so long as there is enough pressure in the pipes, but when the pressure is removed the ball drops down, and then any impurities in the box can pass readily into the main and pollute the water supply. The system adopted in the West Ward is an intermittent, and not a constant one. During the long interval between five p.m. of one day and six a.m. of the next day, the water in the mains is changing its position.

From the top of the ridge it flows backwards in a southerly direction towards the waterworks, and it flows in a northerly direction towards Tarring on the other side. Thus there are long lines of mains which are empty of water for some hours, and then there is a chance of various impurities entering through the hydrants.

The plans and maps laid before you explain the position of affairs. I have examined, with the aid of the sanitary inspector, numerous of these hydrants on two occasions, between half-past five a.m. and half-past six a.m.—*i.e.*, before the morning pumping had begun—and have found the ball down in every hydrant but three on the mains south of the ridge. The three which contained water were full because they lay lower than the rest, and the water could not get away.

All the water in the mains in the early hours of the morning is water which has been pumped into them the previous day. Many of the boxes were clean, but many were more than half filled up with dirty mud or silt, which had washed into them off the roads ; often the ebonite balls were covered with dirt. It is obvious that any surface or road filth may thus enter the mains in wet weather, and a person may drink impure water which has been fouled at a distant point.

In dry or frosty weather it is most likely that nothing injurious can enter the pipes, but in wet weather, or when the frost breaks up, there is a certainty that dirty water enters. At West Tarring the

condition of Beckett and St. Dunstan's Roads has been very bad, and for weeks pools of stagnant water have been met with. A similar condition of things is to be seen at Thorn's Terrace, which lies close to Milton Street, Brunswick Road, and the Parade. Part of Mill Road and Belsize Road has never been taken over by the authority, and the hydrants in all these roads are especially liable to pollution. The appearance and cessation of these fever cases may, I think, be accounted for by the prevalence of wet or dry weather, upon which the amount of pollution depends.

It is, in my opinion, an urgent matter that the water-mains should be at once thoroughly flushed, and that all dead ends should be well washed out. That each hydrant box should be carefully cleared. That all main drains and sewers should be well flushed.

These are immediate measures, but it will be for your authority to take into serious consideration the advisability of giving a constant service of water to the houses in the West Ward, and the adoption of a better form of hydrant, whereby any such pollution can be prevented.

TUBERCULOUS MEAT PASSED IN ONE TOWN AND CONDEMNED IN ANOTHER.

On December 1st an application was made at the Birkenhead Police-court to destroy four pieces of beef, seized by an inspector at the shop of a local butcher. Evidence was given by Inspector Wagstaffe as to the appearance of the meat, its exposure for sale, and its seizure; and by the medical officer of health, Dr. Marsden, to the effect that the meat was tuberculous and unfit for food of man. The solicitor who appeared for the owner stated that the beef was a portion of a carcass which had only just been bought at the Liverpool abattoir, where it was passed by the inspectors. At his request an adjournment was granted till the following day. The Deputy Town Clerk, when the case again came on for hearing, said that facilities had been given the owner to enable him to have the meat examined, and the Corporation was now prepared to place independent evidence before the Court. Mr. Vacher, medical officer of health for Cheshire, was then called. He said the portions of a fore-quarter submitted to him all showed numerous deposits of tubercle on the ribs and between the ribs. A gland some distance from the ribs, which had been divided in cutting one of the joints of meat, was full of tubercle. Much of the pleura had been stripped off. Witness was of opinion the whole carcass was affected, and quite unfit for human food. It would be liable to cause tuberculosis in those eating it. Dr. Barron, professor of pathology at University College, Liverpool, deposed to having examined the four pieces of meat, in each of which he found nodules of tubercle. Though the greater part of the pleural membrane had been cut away, a considerable amount of tubercular matter had been left. In his opinion, the animal had suffered from generalized tuberculosis — the tubercle had been disseminated throughout the various parts of the body. Dr. Pearson gave corroborative evidence as to the presence of tubercle in the meat, and its unfitness for human food. Inspector Renton was called on behalf of the owner of the meat. In company with Inspector Jones and Chief Inspector Luya he inspected the carcass from which the pieces of meat had been taken. On the outside of the lungs there were tubercles (hard ones)—inside, the lungs were "clean." He considered the carcass fit for food and passed it. According to "his experience, when the tubercles were hard the carcass was wholesome, if the tubercles were soft the carcass would be unwholesome." When he noticed glands affected he cut them off. He would have no objection to eating the meat seized after the tubercles had been cut away. On this witness being asked what was the practice as regarded meat inspection in Liverpool, he said, "When the inspectors seized a carcass they placed it in their depôt, where it was seen by the medical officer of health, but the medical officer was not in the habit of seeing carcases before they were placed there." Inspector Jones gave similar evidence. The wholesale butcher from whom the carcass was purchased said the meat was not first-class, but of fair quality.

This concluded the evidence, and the magistrate, having come to the conclusion that the flesh was diseased and unfit for human consumption, gave an order for its destruction.

It is interesting to note that the question in dispute was not the usual one—whether "localized" tubercle could prejudice the whole carcass. It seems to have been admitted that the tubercle was generalized—that is, there was no expert evidence to the contrary—and yet it was contended that if the deposits were all removed from the walls of the thorax, and all the glands affected were cut away, the meat (which did not look unwholesome) was fit for food, and might be eaten without risk.

One can hardly help speculating whether the report of the Bovine Tuberculosis Commission which, we understand, is now almost ready for issue, will provide a standard, and prevent the discreditable scandal of meat being passed in one district and condemned in the next.

Retirement of Dr. Taylor.—Dr. Taylor will retire from the important post of medical officer of health to the city of Liverpool at the end of three months. At the committee meeting, at which the question was considered, the unanimous desire was expressed that Dr. Taylor should receive the utmost amount of superannuation allowance permitted by the statute.

JEWISH CATTLE KILLING AND MOSAIC MEAT.

By J. Lawrence-Hamilton, M.R.C.S.

An absurd fad states that "probably the Jewish race owes its immunity from phthisis to the Jewish method of slaughtering cattle, and to the Jewish mode of meat inspection."

There are no available statistics showing that religious or conforming Jews are healthier or live longer than racial or non-conforming Jews, who have long discarded the ancient Egyptian or Jewish food laws, and who, by taking a more varied diet, obtain chemical constituents which the orthodox Jew is unable to indulge in.

Being myself a Jew, I have bad many opportunities of knowing Jews who have unfortunately died of tuberculous and allied affections.

Meat Inspection.—Extensive lung diseases, like many other maladies, may render the meat of cattle unfit for human food.

On the other hand, my own experience agrees with many more who are familiar with the examination of slaughtered cattle, that a moderate amount of localised lung disease may be associated with meat of the finest healthy nutritive qualities.

Jewish Habits and Diseases.—As regards alcoholic drinks, with few exceptions, temperance among Jews of all climates is true, hence probably their accredited longevity.

Many eminent Jews and Jewesses, both at home and abroad, have, by taking too little out-door exercise and by over-eating, "dug their early graves with their teeth."

Everywhere Jewish men and women are peculiarly liable to diseases of indigestion or dyspepsia, to diabetes, cataract, etc., which would seem often to arise from eating too much and digesting too little, frequently aggravated by want or deficiency of regular exercise in the open-air.

Similar conditions tend to produce undue obesity, irritability, "temper," and debility among many Jewesses.

Since the Jews have been allowed to leave their Ghettoes, especially their present life of superior environment in Great Britain and our colonies has progressively improved the physique, the physical force, the bodily endurance, and the complexions of modern Jews and Jewesses as compared with Jews and Jewesses of the recent past.

Among Jews their excessive proportion of insanity, of brain, spinal, and other "nervous" diseases and "nervous" irritability seem due chiefly to too frequent close consanguineous marriages.

"Jewish" Cattle Killing and Meat.—Personal observations in slaughter-houses and of physiological and pathological research in experimental laboratories have convinced me of three things :—

1. That the Jewish method of killing cattle is consummately cruel and clumsy, tending to spoil the meat and accelerate early decomposition.

2. That the Jewish inspection of meat is a farce, and their inspectors of meat are ignorant of veterinary science, the microscope, etc.

3. That the Christian method of stunning cattle with a pole-axe or mallet, then pithing, or else dividing the spinal cord near the brain, supplies meat containing somewhat less blood than "Jewish" meat.

Hence such "Christian" meat keeps fresh somewhat longer than "Jewish" meat.

Fright or Fatigue Fever.—As in the Jewish process, cattle are slowly bled to death without being previously made insensible by stunning, the animal suffers avoidable agonising fright or fatigue.

Turning to my notes written at the time in a Jewish slaughter-house early in 1890, I find the following remarks about the Jewish method of killing calves :—

A rope is attached to the hind legs of the calf, by which the poor brute is suddenly raised or vertically hoisted up so that its nose almost touches the ground.

Thus hideously frightened, the Schauchet or Jewish cattle cut-throat, with a sharp knife then divides the throat and the neighbouring vessels of the calf.

The muscles of the conscious, slowly-bleeding calf tremble all over, and it loudly snorts up the air.

I have seen such a calf make eight full revolutions of a circle.

Watch in Hand I have timed the process of dying to occupy about seven minutes.

The Physiology of Shock, etc.—The pallor in shock or fright seems due to spasm of the cutaneous vessels.

In the case of animals suddenly exhausted by excessive exertion, it would appear that the blood becomes thicker, due probably to the demands of the tissues for fluid.

Experience tells us that, owing to increased proneness to blood-clotting, less blood can be obtained from animals which have been chased, long pained, or frightened, than from those in health, at rest, and during intense insensibility, as by stunning healthy cattle in the slaughter-house.

Evidence goes to show that the tissues and blood of excessively fatigued animals are abnormal.

Darwin and others have proved that fright is a form of fatigue. Recent research shows further that shock and terror seem likewise to increase abnormal or degenerate *metabolism*, or the continuation of healthy bio-chemical changes in living tissues.

Metabolism is somewbat diminished in natural healthy sleep.

During the hibernation, and during the æstivation of animals and plants, their metabolism is reduced almost to the vanishing point.

By skilfully stunning healthy cattle, and thus producing immediate intense insensibility, the abnormal or *degenerative* metabolism in the blood

and tissues is prevented, which occurs in animals painfully dying in consciousness, as by bleeding to death in the unstunned but cut-throat system of slaughtering cattle according to the "Jewish" ritual.

Animals dying in prolonged pain undergo early *rigor mortis* or after-death stiffening, which quickly disappears, and subsequently the tissues more readily decompose.

In his "Expressions of the Emotions in Man and Animals" Darwin has fully discussed the physiology of fear or terror.

In his "Ptomaines and other Animal Alkaloids," Dr. A. C. Farquharson has carefully collected many instances of prostration from over-exertion or fatigue-fevers and diseases produced by fright, exhaustion, etc.

Recent References.—1. Mr. H. Beringer, the hon. secretary of the Berlin Society for the Prevention of Cruelty to Animals, proves not alone that the Jewish method of killing cattle is very cruel, but also that the public agitations against this mode of cattle slaughtering in Switzerland, Saxony, and elsewhere abroad, have had absolutely nothing to do with the anti-Semitic movements. (See his long elaborate article in the *Times* of November 16th, 1893.)

2. The July, 1893, "Proceedings of the National Veterinary Association" contain a monograph on "Meat Inspection, Slaughter of Cattle, etc.," by Professor McFadyean, B.M., and, at the subsequent discussion of this paper, the Jewish method of slaughtering was condemned as cruel and revolting. No one present defended the cattle-cut-throat procedure of the Jews.

3. "Public Slaughter-Houses," by Sir Ben. W. Richardson, M.D., in the *New Review*, June, 1893, condemns the "most painful" and prolonged Jewish mode of cattle slaughtering, etc., where the ox may be fully "twenty minutes" dying, whilst, if properly pole-axed, it falls instantly, giving no after-sign of pain. Sir B. W. Richardson found less blood in a "Christian" slaughtered ox than in a "Jewish" killed ox.

4. 1890, "Meat Inspection," by William Wylde, who has spent upwards of forty years in inspecting meat at slaughter-houses, also condemns the Jewish mode of cattle-killing.

5. "Sea-Fishing: Comparative Rigor Mortis in Men and Animals; Crimping, etc.," in *Land and Water*, December 27th, 1890, by J. Lawrence-Hamilton.

FEVER HOSPITAL ACCOMMODATION.—The Hospital Sub-Committee of the Leeds Corporation have issued a valuable report on the results of their inspection of a considerable number of fever hospitals in other towns, and on the requirements for their own local hospital. The first part of the report is illustrated by plans of the various hospitals visited. Detailed descriptions of the Newcastle-on-Tyne, Hull, Salford, and Nottingham Fever Hospitals have been previously issued by their respective medical officers. The present report is a useful addition to the list by Dr. Spottiswoode Cameron. Would it not be practicable to issue in one volume a complete description of the more important modern fever hospitals, thus saving visiting committees and medical officers of health considerable trouble in investigating the special advantages of each hospital singly?

REPORTS OF MEDICAL OFFICERS OF HEALTH.

DUBLIN.

FROM Sir Charles A. Cameron's annual report for 1892 the following extracts are taken:—

Corrected Death-rate for Dublin.—The recorded death-rates of towns require to be corrected for age and sex distribution. Females live longer than males. It follows, therefore, that if two towns were in an equally healthy state, but that one of them contained a larger proportion of females than the other, the town with the lower proportion of females would have the higher death-rate. Similarly, a town, a large proportion of the inhabitants of which were at the most viable periods of life, would have a lower death-rate than a town equally healthy, in which the ages of the population were less favourable to longevity. The death-rate at different ages in the whole of England and Wales being ascertained, the Registrar-General of those countries corrects the recorded death-rates in the towns in which the ages of the population vary from those of the country at large. Norwich was the only town in which it was necessary to reduce the crude or recorded death-rate; in all the other towns it was necessary to increase it, and in some, like Manchester, very largely. In Dublin the ages of the population were favourable as regards longevity, and in Belfast they were even more so. I have corrected the recorded death-rates for Dublin, Belfast, and Cork, and find them to be as follows:—

	Recorded Death-rate.	Corrected Death rate.
Dublin	28·4	30·8
Belfast	26·5	30·9
Cork	26·4	28·9

The Appointment of Public Analysts. — On August 6th, 1860, the first general statute for preventing the adulteration of articles of food and drink was passed by the Parliament. It provided for the appointment of public analysts, but not for inspectors of food.

The first public analyst appointed under this Act was the late Dr. Henry Letheby; he was elected to that office by the Corporation of London. The next appointment was made by the Corporation of Birmingham, and the gentleman selected by them, Dr. Alfred Hill, is still in office. I was the third public analyst appointed, having been elected by the Corporation of Dublin on October 3rd, 1862.

The Act of 1862 was practically inoperative every place save in Dublin. Some years ago, having made inquiries on this subject, I found that there were no prosecutions instituted under its provisions, except in this City. Shortly after I was appointed I suggested that the inspectors of the markets should purchase articles of food on their own behalf, and submit portions.

Why was this Clause Repealed?—One good clause in the Acts of 1860 and 1872 was repealed by the Act of 1875, namely, that which enabled justices to advertise a second conviction in the

newspapers, or otherwise, and at the expense of the offender. Advertisements of this kind frequently appeared in the Dublin newspapers. In the front page of the *Irish Times* for February 27th, 1872, the following advertisement appears, much "displayed" and in large type :—

PUBLIC ADVERTISEMENT.—ADULTERATION OF MILK.—At the Northern Police Court, on Saturday, the 17th of February, 1872, John Doyle, dairyman, of 127 Dorset-street, was Fined Five Pounds for Selling Milk adulterated with fifty per cent. of water.

And it being his second conviction for a similar offence, the publication of this advertisement was ordered by the magistrate who heard the case. In addition to the above penalty, cost of advertisement to be defrayed by said John Doyle.

IPSWICH.

Dr. G. S Elliston, in his annual report for 1892, describes an outbreak of small-pox, apparently caused by importation of infection from Yarmouth.

Small-pox.—No death has been registered from this disease for the last eight years, but early in April it was introduced into the town from Yarmouth, in a manner so peculiar that it became the subject of a long inquiry before the borough coroner. It appeared that a girl had been under treatment for typhoid fever in the Yarmonth Fever Hospital, in which were also cases of small-pox, and when discharged was brought home to Ipswich by train. The journey was too much for her, and she died a few hours after her return. About twelve to fourteen days afterwards an inmate of the house, and a neighbour who came in to help, both developed small-pox, and were removed to the fever hospital. In this outbreak there were seven cases, occurring in four houses ; all were safely isolated in the fever hospital, and complete disinfection was carried out. Re-vaccination was offered, but accepted in only a few cases ; it appears to have gone out of favour altogether in Ipswich. This is much to be regretted, as there is no doubt that re-vaccination affords an almost absolute safeguard against small-pox when it breaks out in a small house.

CAMBRIDGE.

That a town of the imperial importance attaching to Cambridge should have defective isolation accommodation is a source of some surprise, but that this is the case is clear from Dr. Anningson's annual report, in which he quotes a special report made by him to the Sanatorium Committee. This report states the facts in a trenchant manner, and thus completely throws the onus of any further default upon the sanitary authority. The building of a new administrative block does not by any means completely meet the requirements of the case.

Deficient Isolation Accommodation. — "Wards Nos. 1 and 2 at the Infectious Diseases Hospital are at the present time both occupied by cases of scarlatina (nine in number). There are left, therefore, three or four beds at the utmost available for other cases of the same disease. The nurse's room of No. 3 Ward is occupied by a case of typhus fever. The committee will, therefore, understand that the only accommodation left at their disposal for the isolation of cases of cholera, diphtheria, and small-pox, also for typhoid fever, if Addenbrooke's General Hospital should not be in a position to take in such, is the main body of No. 3 Ward.

"The committee will further understand that this arrangement is by no means satisfactory, and will require much caution ; and that the first case admitted of any one of the above diseases will leave absolutely no accommodation at all for the remaining two or three diseases.

"Furthermore, there is no accommodation for another nurse beyond the wards occupied by patients, and the matron has been obliged to give up her own sleeping apartment for the accommodation of a night nurse for rest by day ; such an arrangement as this is not creditable to the institution, and should not be tolerated for a day longer than urgent necessity demands. In the presence of this serious aspect of affairs and the probable length of time needful for the extension of buildings, I very strongly advise the committee to hire a house which is now to let, situate directly opposite the hospital grounds. I have examined the house and think it well suited for the purpose of nurses and convalescents of one disease. If this house were acquired it would at once set free No. 2 Ward for any other cases."

The authority subsequently decided on the erection of a new detached administrative block at a cost of £1,600.

THE PUBLIC HEALTH AND THE PUBLIC.*

By P. BOOBBYER, M.D., M.O.H. for Nottingham.

(*Continued from page* 50.)

DR. BOOBBYER further referred to the gross overcrowding and neglect of ventilation so commonly found in the dwellings of the poor, in schools (especially in small class-rooms), and in factories and workshops, and cited many examples gathered from his own recent experience. He gave it as his opinion that much of the existing evil could be readily obviated if the people most affected were sufficiently instructed to understand the advantage to be gained by an alteration of the conditions under which they lived. He next alluded to the dirty habits of the poor in their homes, and showed how these habits, and the ignorance from which they sprang, as much as any other factor, affected the spread of infectious diseases among them. After touching upon the questions of the disposal of house refuse, and of the dry as opposed to the water carriage system of sewage disposal, in connection with the ignorance and inertia of the masses, he spoke of the total lack of knowledge of elementary dietetics among the poor, which led, he said, not

*Address at opening of current Session of Midland Branch.

only to the injury of their health, but also to a waste of their scanty resources.

He said that he could not conclude such a diatribe against popular ignorance without suggesting some scheme for its abatement. As most of what he had already said was sufficiently well-known to thoughtful and observant people, so that which he had to suggest had already been either partially effected or devised. But what was specially required was co-operation among educating bodies and authorities, and systematic organisation of schemes of instruction, and until this was in some measure attained he feared that but little real advancement was to be hoped for.

The scheme he would suggest might be broadly codified as follows:

1. Special graduated instruction in hygiene in schools of all classes.

2. Technical hygienic instruction to craftsmen of various classes in towns and counties organised by the Town and County Councils.

3. Instruction in hygiene to persons of education and leisure in both sexes with the view of qualifying them as lecturers to adult audiences.

4. More or less popular instruction to all comers afforded by the latter class of teachers, and rendered accessible to all by the frequent delivery of lectures in populous districts of towns and counties.

STAFF OF SANITARY INSPECTORS IN LONDON.—Dr. Warry, in his annual report on the sanitary condition of the Hackney district, gives a valuable table from which the relative strength of the inspectorial staff of each district or vestry in London can be gathered. For the whole of London (excluding Hackney) the average number of inhabitants per inspector is 22,243; the number of houses per inspector, 2,908. Of the northern districts of London, Hackney has the smallest proportional staff, one inspector for every 45,906 inhabitants, St. Pancras coming next with one inspector for every 29,304 inhabitants. Of the eastern districts, St. George's-in-the-East has one inspector to 15,182, and Shoreditch one to 31,001 inhabitants. Of the southern districts, Wandsworth is most efficiently manned with one inspector to every 13,077 inhabitants, Plumstead least efficiently (one to 29,513 inhabitants), and Battersea next (one to 21,494). Of the two western districts, Westminster had one inspector to 18,508 inhabitants (or to 1,918 houses); Kensington, one inspector to 27,720 inhabitants (or to 3,667 houses). The City heads not only he central districts but the whole of London with one inspector to 3,409 inhabitants (or one to 522 houses), St. Giles coming next with one inspector to 7,955 inhabitants, and Holborn last with one inspector to 16,751 inhabitants. The superiority of the City staff is not so great as these figures would imply, as an enormous number of business premises not slept in require sanitary inspection.

RIVER POLLUTION AND SEWAGE DISPOSAL.

By GEO. REID, M.D.,
M.O.H. to the Staffordshire County Council.

THE letter from Dr. Jepson which appears in this issue of the journal calls attention to a subject which, as he says, at the present time is engaging the attention of many sanitary authorities and their advisers throughout the country. The Local Government Act of 1888 imposes the duty on county councils of enforcing the provisions of the Rivers Pollution Prevention Act, 1876, and the supplementary Act of 1893 makes it clear that long custom as regards the discharge of sewage into streams in no way relieves local authorities of their responsibilities. The question as to what is the best method of sewage disposal is not one which admits of a uniform answer; it is governed by local conditions, as well as the nature of the sewage which has to be dealt with. Most unbiased authorities on the subject, however, are agreed that where land treatment is possible it is likely to produce more successful results than any form of artificial filtration. It is also generally admitted that whether the method of land treatment is by broad irrigation or intermittent downward filtration, the sewage should invariably be clarified by precipitation before it is applied to the land. If the statements of promoters of the various methods of chemical precipitation and filtration recently introduced could be accepted, the solution of the problem would be extremely simple, but the experience afforded by failures in the past—which have resulted in large sums of money being thrown away—points to the necessity of extreme caution on the part of authorities before they commit themselves to any particular system of sewage disposal. Appearances are very misleading, and inexperienced persons are apt to form too favourable an opinion of an effluent which, although perfectly clear, may be chemically very impure and quite unfit to be discharged into a stream. For this reason it is most desirable that committees of local authorities when visiting sewage works, with the view of assisting them to form an opinion as to the efficacy of various systems of disposal, should be accompanied by capable advisers who have made a special study of the subject. Even then it is difficult to arrive at the truth, as it is only by obtaining continuous records of analyses that the chemical purity of any effluent can be ascertained, and this unfortunately is seldom possible. It is a question, therefore, whether real good results from these visits of inspection, and, in all probability, sanitary authorities would be less likely to make mistakes if, in place of endeavouring to form an opinion for themselves, they would seek the joint advice of a reliable engineer and a skilled chemist who has given special attention to the question of sewage disposal.

The investigations into the question of river

pollution which are now being conducted in various counties where joint boards have been formed, or where county medical officers of health have been appointed, must lead to valuable results, and will, no doubt, in time enable authoritative statements to be made founded upon accumulated facts regarding existing processes of sewage disposal. At present, however, apart from the evidence of interested parties, and independent evidence which is largely experimental, few facts regarding the utility of the more novel processes are obtainable. It is to be regretted that the Local Government Board—the authority on whom the responsibility of sanctioning the borrowing of money for sewage disposal purposes rests—have not thought fit to undertake an inquiry on a large scale, with the view of assisting local authorities in forming an opinion regarding the efficiency of different methods of disposal.

No doubt the Editor will be glad to publish any remarks bearing on sewage disposal from those who are specially engaged in investigating the subject.

LAW REPORT.

Case under Section 75 of the Housing of the Working Classes Act, Eighteen Months after the Commencement of Tenancy.

On November 3rd, at the Clerkenwell County Court, before Judge Meadows-White and a jury, Frederick Samuel Steggall, of 3, Ebenezer Buildings, Rotherfield Street, Essex Road, sued Thomas Buckland, of 495, Old Kent Road, for £50 damages for injuries caused by the insanitary condition of the premises, 3, Ebenezer Buildings. Mr. Corry Grant, barrister, appeared for the plaintiff; and Mr. Lynch was counsel for the defendant.

The plaintiff, a shoemaker, said on April 9th he took the basement flat of 3, Ebenezer Buildings, from the defendant for 6s. 8d. a week. He had not occupied the three rooms comprising the flat long before he discovered that they were damp. He also detected bad smells, which he believed to be sewer gas. One cistern in the kitchen supplied the water for drinking as well as that for the closet. Sewage was forced up the gulley-holes in the back yard, and the premises were often flooded. His wife was taken ill, shortly after they moved into the flat, with a sore throat. In November she had rheumatic fever, in February of that year she had typhoid fever, and in April she contracted diphtheria. In May she was prematurely confined, the child dying two hours afterwards. In February of this year five of his children were stricken down with typhoid fever, and two died within a few days.

The Judge: How many persons lived with you in the basement?

Plaintiff: My wife and eight children, all of whom were stricken down with either typhoid fever or some other malady. Continuing, the plaintiff said he himself was ill, and suffered from bad pains in the head. He had now quitted the premises. Some repairs were executed while he occupied the premises; some time, however, after he complained to Mr. Redgrove, the defendant's agent.

Cross-examined: He did not know that the drains in the basement had been stopped up with a bottle and some house flannel. He paid his rent regularly until February 16th, when he was thrown out of work. On that date one of his children died.

Louisa Steggall, wife of the plaintiff, said bad smells emanated from the closet and sink of the basement flat. Her health was good prior to going to Ebenezer Buildings, but a week or two after living there she had a sore throat. She complained of the smells to the agent, who said he could not tell where the smells came from. Soil, however, was forced up the gulleys in the yard, and soil oozed from the soil-pipes leading from the upper tenements. The closet used by the occupants of the basement led into the kitchen, and had no means of ventilation. She was in the habit of going out as a monthly nurse, but since she had lived in the defendant's flat she had been able only to follow her employment on rare occasions, owing to the illness in her own family. In November last, as stated by her husband, she had rheumatic fever, in February she had typhoid fever, later she contracted diphtheria, and was prematurely confined in May. The infant was born black, and only lived two hours.

Miss Lewis, a district visitor connected with the Rosemary Branch Mission, proved calling upon Mrs. Steggall, and detecting in her kitchen bad smells. She made a representation to the vestry about the condition of the premises.

Harriet Slade said she and her family occupied the basement of 3, Ebenezer Buildings in August, 1891. The kitchen was often flooded with water, and filth was forced up the sink-hole. Bad smells came from the water-closet. One of her children was taken ill with diphtheria, and died in a few days. She herself contracted some throat trouble, and lost her voice for months. Some little time after she left the building she was confined of twins, and both the infants died. Her doctor had told her that if she did not leave the place she would be carried out. He meant that she would have died.

George Volaire, engineer, in the employment of the Sanitary Protection Society, said in July last he examined the basement then occupied by the plaintiff. He found that the drains ran under a passage which divided the flats. Sanitary arrangements were such as to render the house unfit for human habitation. The main soil-pipe was inside the building, and was of light cast-iron. It was badly jointed; in fact, it was so constructed as to make it impossible for the joints to be properly made. There was no proper ventilation of the main drain It was against sanitary principles that the closet

should open into the kitchen. The water-closet was radically bad. He had never seen worse.

James Edward Smith, builder and surveyor, said in his opinion the basement of 3, Ebenezer Buildings was unfit for human habitation. Bell-traps were used in the house, which he considered improper.

Mr. Lynch : London gets on very well with bell-traps?

Witness : People get killed by them.

Dr. Willoughby said he was employed by the Mansion House Council on the Dwellings of the Poor to inspect No. 3, Ebenezer Buildings. He examined the whole building, and he had no hesitation in saying that the basement was utterly unfit for human habitation. The joints of the soil-pipe, which was inside the house, were palpably defective, and the dust-shoot opened into one of the rooms.

Dr. Llewelyn said he attended members of the plaintiff's family, which were suffering, in the early part of this year, from typhoid fever. Going into the basement was like putting one's head over a sewer. Sewer gas pervaded the whole atmosphere of the basement ; the stench was abominable. The flush-pipe of the water-closet was directly connected with the drinking cistern. There was a leakage from the roof of the kitchen, and fluid of some kind dripped into the cistern containing drinking water. There was a film on the water. There was no cover to the cistern. All the plaintiff's family had diphtheric throats and symptoms of typhoid, and would all have died if they had continued to live in the buildings. Mrs. Steggall was prematurely confined of a child, which was born black, and the miscarriage was brought on by the state of her health. Illness in the plaintiff's family was caused by the bad atmosphere and bad water. If he had wanted to kill a person he should have compelled him to drink the water he saw in the basement of No. 3, Ebenezer Buildings.

James Jordan, one of the sanitary inspectors of the parish of Islington, for the defence, said when he visited the premises occupied by the plaintiff they were in a sanitary state. One of the drains was stopped up with a brush and some flannel.

The defendant contended that the premises were in a sanitary state.

Cross-examined : He was convicted some time ago at the Southwark Police Court and fined £20, for disobeying an order of the vestry to execute certain sanitary works in connection with some of his property. He believed he was unjustly punished. After the inquest on the plaintiff's two children the Islington Vestry ordered him to execute certain sanitary improvements at 3, Ebenezer Buildings.

The Judge, in summing up, said the jury had to decide whether, within the meaning of the Artizans and Labourers' Dwellings Act, the premises in question were fit for human habitation.

The jury returned a verdict for the plaintiff for £28.—From the *Islington Gazette*.

REVIEWS.

Water Analysis : The Interpretation of Results. (Reprint of article in *Practitioner*. By F. Wallis Stoddart.)—Mr. Stoddart's paper deals almost exclusively with the significance of nitrates in potable waters, and contains an account of a number of experiments made to ascertain the effect of the filtration of polluted waters through coarsely-powdered chalk seeded with various organisms. Chalk treated first with polluted urine and then with a polluted well water, in which the nitrous fermentation predominates, was found to oxidize the organic matter in sewage rapidly. In discussing the amount of nitrates which may be found in chalk waters, Mr. Stoddart appears to be unacquainted with a series of analyses by Dr. Thresh (*Essex Naturalist*, 1892), which prove that the water from the chalk underlying the thick beds of London clay in Essex is almost entirely destitute of nitrates, and that the amount of these salts increases as the protecting layer of clay thins out. Mr. Stoddart advocates the invariable determination of the nitrates in all waters before expressing an opinion as to the quality of the water. We certainly should have thought that no analyst would have considered an examination complete without an estimation of the nitric nitrogen. How far the information will be of use is another matter. A water may be loaded with nitrates and yet be harmless, or it may be almost free from these salts yet be capable of producing wide-spread epidemics. To accept Mr. Stoddart's proposed standard, or any other standard, therefore, may lead to most erroneous deductions, and is just as unscientific as the proposed standard limit to the number of micro-organisms, in which no cognisance is taken of their source or character. Year by year evidence is accumulating proving the very limited value of a mere chemical analysis of a potable water. Such an analysis is only one of the factors which should be taken into consideration by a medical officer of health before expressing an opinion upon the quality of a drinking water.

Suicide and Insanity : A Physiological and Sociological Study. By S. A. K. Strahan, M.D. (Swan Sonnenschein and Co. 5s.)

Those interested in the question of suicide will find this volume to be a fairly complete and exhaustive study of it. Without agreeing in all respects with the author's views, it must be admitted that they are stated temperately and judiciously. The first chapter is occupied by a sketch of the history of suicide in early times. The three first suicides mentioned in the Bible evidently did not belong to the class of uncontrollable suicide. Samson, and Saul and his armour bearer did not commit suicide for love of death, but from force of external circumstances. The fourth and last suicide mentioned in the Old Testament belongs to the same class as the preceding, for Ahitophel hanged himself to escape the consequences of his unsuccessful treachery. Abimelech might possibly be added to the list, for he commanded his armour-bearer to slay him with his sword that he might escape the humiliation of dying by the hand of a woman who had broken his skull.

The instinct of self-preservation secures the maintenance of individual life, while the still stronger procreative instinct secures the continuance of the species. Dr. Strahan lays down the principle that the absence of the fundamental instinct of self-preservation is irrefragable proof of the unfitness to live, and that voluntary death becomes consequently merely one of the eliminative processes of natural selection. This rule will embrace the "true suicides" who leave life because they are disgusted or tired of life, or because they have a morbid craving for death. It does not, however, comprise the comparatively small class who destroy their lives either because they conclude that death is the most acceptable of impending evils, or they wish to gain by their self-destruction something they consider more valuable than the forfeited life. The latter are called by Dr. Strahan rational or quasi suicides, and they include the suicides of religious devotees, the suicides of those who desire notoriety, or who die to gain some supposed benefit for others, like the

mythical Marcus Curtius; and the suicides of those who die to escape evil. There is reason to believe that a large proportion of those who annually flung themselves under the wheels of the car of Juggernaut did so in order to escape the tortures of leprosy and other diseases. Epicurus said "Suffering is inevitable," but pointed out to his followers "it is not necessary that we remain in suffering." Early in the sixteenth century Sir Thomas More, in his "Utopia," advocated suicide to escape suffering. History and the newspapers contain numerous examples of suicides to escape slavery, judicial punishment, dishonour and disgrace, and poverty, in persons in whom there is no reasonable ground for saying that the self-victim was insane.

True or irrational suicides are classed by the author into three groups: (*a*) in which there is mental aberration; (*b*) in which the act depends upon an irresistible impulse, and in which there is no mental aberration; and (*c*) in which a certain predisposition makes it possible for a slight shock, trial, or irritation to awaken the unnatural impulse. It is impossible to follow in detail the study of these varieties of suicide, though it would well repay it. It is remarkable how slight the provocation to suicide may be sometimes, as indicated by the formation of "suicide clubs." If the statistics are trustworthy, the Celtic races are the least liable to suicide. The maximum amount of suicide occurs in one or other of the spring or summer months, as does also the maximum amount of homicide, crimes against the person, crimes against chastity, and the conception of illegitimate children.

Clinical Observations on Diphtheria and Croup. By Dr. A. Wilson. (Reprint from *Edinburgh Medical Journal*, August, 1892.)—The observations in this paper are by no means limited to the treatment of these diseases; on the contrary, a considerable portion is devoted to the discussion of the etiology of diphtheria. The author is no believer in the Klebs-Loeffler bacillus. He regards diphtheria as a constitutional disease, and refers to experiments he has himself made upon pigeons pointing to this conclusion, but what these experiments were he does not describe. Other experiments with "my diphtherococci," and their effect in producing certain changes in milk, are also referred to but not described. To all the supposed causes he would add "the bad building and bad drainage which notably prevails around London." The treatment he advocates is one of vigorous antisepsis, the strength of the drugs recommended being based upon experiments made with his diphtherococci in sterilized gelatine, to which the various antiseptics had been added. Five per cent. sulphurous acid he found useless, whilst 2 per cent. boracic acid prevented growth; alcohol is to be avoided; strychnine is useful. So much for our cherished traditions.

THE TESTIMONIAL TO DR. SYKES.

The following additional donations are acknowledged:—

	s. d.		s. d.
Dr. Bate	10 6	Dr. Stevenson	10 6
Dr. Hunter.....	10 6	Dr. Groves.....	10 6

School Hygiene.—Professor Glaister of Glasgow, in an address to the Glasgow Association of the Educational Institute of Scotland, urges that the present amount of space per child in this country, as allotted by the Education Department, is hurtfully insufficient and totally inadequate for safe and efficient ventilation. We ought, he held, to demand for our children not less than the Canadian Government provided for theirs—namely, 250 cubic feet per child.

CORRESPONDENCE.

RIVER POLLUTION AND SEWAGE DISPOSAL.

To the Editor of Public Health.

Sir,—Legislation having so far advanced as to necessitate the careful consideration and study of river pollution and disposal of sewage by very many sanitary boards, it seems a very opportune time when you may furnish to your readers the fullest possible information bearing upon the above subjects. County councils are putting pressure upon local authorities urging them to adopt schemes for sewage disposal, and they, on the other hand, are looking about for information as to the best schemes to adopt, and without wasting the money of the ratepayers. Medical officers of health require this information, as well as some medical men who are members of sanitary authorities, and it is only to the medical press that they can turn. If, therefore, you can supply some account of successful sewage schemes, and where situated, and the names of the engineers, you will confer a benefit on the profession as well as the public generally.—I am etc.,

Edward Jepson, M.D.

Durham, Nov. 30th, 1893.

[This letter has been forwarded to Dr. Reid, who has contributed an article on its subject matter (page 125). The matter is one of great importance, and other contributions will be welcomed.—Editor Public Health.]

APPOINTMENTS.

Medical Officers of Health.

Ashby, Alfred, M.B.Lond., F.R.C.S.Eng., re-appointed M.O.H. to the Reading Town Council.

Berry, Fredk. C., B.A., M.D.Dubl., appointed M.O.H. for the Burnham U.S.D. of the Axbridge Union.

Body, H. M., M.R.C.S., L.S.A., re appointed M.O.H. for Crediton.

Brown, Jno., M.D., D.S.Sc.Vict., re-appointed M.O.H. to the Bacup Town Council.

Clark, F. W., M.D.Durh., appointed M.O.H. for the Lowestoft U.S.D.

Cowan, M. W. W., M.B., C.M.Edin., appointed M.O.H. for the Leigh District of the Martley Union.

Jones, F. Felix, M.R.C.S Eng., L.S.A., and D.P.H., re-appointed M.O.H. for the combined districts of the Llanfyllin Union.

Priestley, Joseph, B.A., M.D., D.P.H., re-appointed M.O.H. for Leicester.

Stathers, G. N., M.R.C.S., D.P.H.Camb., appointed M.O.H. to the Brackley R.S.A.

Temple, Lewis D., M.B., C.M.Glas., appointed M.O.H. for Saddell.

Watterson, Jno. W., M.B., C.M.Edin., appointed M.O.H. to the Morecambe Local Board.

Webb, W. H., L.R.C.P.Lond., M.R.C.S., appointed M.O.H. to the Kingsbridge Local Board.

ANNOUNCEMENT.

The evening meetings of the Incorporated Society of Medical Officers of Health will be devoted during the present session to the consideration of the following subjects:—

February.	"Vaccination and the Laws relating thereto."
March.	"Death Certification and Registration."
April.	"The Training and Qualification of Medical Officers of Health."
May.	"Puerperal Fever, the Etiology of."

Wanted, copies of Public Health for October, 1892. Full price given by Publisher.

PUBLIC HEALTH,

The Journal of the Incorporated Society of Medical Officers of Health.

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ADVERTISEMENTS. — *Communications relating to Advertisements should be addressed to Messrs. W. H. & L. Collingridge, 148 and 149, Aldersgate Street, E.C.*

Every Reader of a Paper before the Society, or Contributor of a Signed Article, is entitled to twenty-five copies of the issue of PUBLIC HEALTH *containing the contribution in question; but application for this or any smaller number must be made to the Editor not later than the* TWENTY-FOURTH *day of the month previous to insertion of the Contribution.*

Medical Officers of Health and other Correspondents are requested to send regularly all published reports and matters of interest bearing upon Sanitation to the Editor, 15, College Road, Brighton.

NOTICE.

THE INCORPORATED SOCIETY OF MEDICAL OFFICERS OF HEALTH.

20, Hanover Square, London, W., January, 1894.

NOTICE is hereby given that an ORDINARY MEETING of the SOCIETY will be held at No. 20, HANOVER SQUARE, W., on MONDAY, the 19th day of FEBRUARY, 1894, at 7.30 p.m., for the transaction of the undermentioned business:—

AGENDA.

1. Minutes.
2. Report of Council.
3. To Elect Candidates. The following candidates have been duly nominated for election:—

As Fellow—

HERBERT WILLIAMS, M.D., London, Cert. Public Health, London University, 22, Cheyne Grove, Chelsea; Assistant M.O.H. Port of London; proposed by W. G. WOODFORDE, M.D., seconded by W. COLLINGRIDGE, M.D.

As Member—

EDWARD HENRY LEMON, M.R.C.S., L.R.C.P., D.P.H., Ireland, Croydon Infirmary, Surrey; proposed by F. P. WIGHTWICK, M.D., seconded by ARTHUR NEWSHOLME, M.D.

4. Nomination of Candidates.
5. Correspondence.
6. To receive Dr. Armstrong's resolution *re* "Movement of Vagrants."
7. Miscellaneous business.
8. At 8 o'clock, a Discussion will take place on "VACCINATION AND THE LAWS RELATING THERETO." The Discussion will be opened by Dr. E. Seaton, M.O.H. Surrey County Council, and Dr. T. Eustace Hill, M.O.H. Durham County Council. The following gentlemen also hope to take part in the discussion: Drs. C. E. Paget (Salford), L. Parkes (Chelsea), J. W. Priestley (Leicester), J. F. J. Sykes (St. Pancras), W. N. Thursfield (Shropshire), F. Vacher (Cheshire), and E. F. Willoughby.

F. P. WIGHTWICK, 55, Upper Brook St., Grosvenor Sq., W.
J. C. THRESH, The Limes, Chelmsford.
} *Hon. Secs.*

PROCEEDINGS OF THE INCORPORATED SOCIETY OF MEDICAL OFFICERS OF HEALTH.

A MEETING of the Incorporated Society of Medical Officers of Health was held at No. 20, Hanover Square, on Monday, January 15th, 1894. Present: The President (Dr. W. T. G. Woodforde) in the chair, Drs. L. C. Parkes, Geo. Reid, A. Whitelegge, W. H. Kempster, D. T. Skinner, L. W. Darra Mair, W. Lake, H. Stoft, W. Collingridge, J. F. Sykes, G. Dickenson, E. Sergeant, C. Sanders, A. Newsholme, L. Wilde, S. Davies, R. Bangay, and E. F. Willoughby, and the Hon. Secs., Drs. Wightwick and Thresh.

The minutes of the last meeting of the Society on December 18th, 1893, were read, approved, and signed by the Chairman.

REPORT OF THE COUNCIL.

The HON. SECRETARY read the report of the Council:—

(*a*) That the Council having received a report from the Sub-Committee appointed to consider the best mode of utilising the funds derived from the Berridge Legacy, recommend that a sum of £25 should be placed at the disposal of the Editor during the present year for the purpose of remunerating contributors to the Journal.

(*b*) Reporting other proceedings of the Council for the information of the Society.

Resolved, on the motion of Dr. ARMSTRONG, that the report be received and adopted.

Election of Fellows, etc.—The following gentlemen having been duly nominated for election, a ballot was taken, and they were declared by the CHAIRMAN to be unanimously elected.

As Fellows—

George Francis Jones, M.R.C.S., L.S.A., Clarence House, Southend-on-Sea, M.O.H. Southend-on-Sea U.S.D.

Robert Graves Burton, M.D.Edin., L.R.C.P.Edin., 1, Gloucester Villas, Hanwell, W., M.O.H. Hanwell U.S.D.

Frederick Stockwell, M.D., Benton, M.O.H. Benton.

Henry R. Kenwood, M.B., L.R.C.P., D.P.H., Royal College Physicians and Surgeons, Lond., 189, Adelaide Road, N.W., M.O.H. Urban Sanitary District of Finchley.

As Associates—

Adam, Wilson, L.R.C.P., F.R.C.S.Edin., Osborne House, Jesmond Road, Newcastle-upon-Tyne.

H. W. Newton, L.F.P.S.Glas., L.F.A., 2, Ellison Place, Newcastle-upon-Tyne.

Sir George A. Pilkington, M.R.C.S., J.P., Belle Vue, Lord Street, Southport.

Nominations.—A number of candidates were then nominated for election at the next meeting.

Presentation to Dr. Sykes.

Dr. Sykes, who for some years has acted as Secretary of the Society, having recently resigned, was presented—as the result of the subscription opened among the Fellows of the Society for the purpose of offering him a testimonial, in recognition of the valuable services he has rendered to the Society—by the President, acting on behalf of the Society, with a handsome salver, and a magic lantern apparatus.

Dr. Wooforde (the President), in making the presentation, said: I rise to perform what is a very pleasant duty, and it is to act as your mouthpiece in expressing to our valued friend Dr. Sykes our very hearty appreciation of the valuable and able services he has rendered to the Society during the years he has acted as its secretary. We all know very well that when he first took office we were comparatively a small body; we also know how large a share he had in the carrying out of those changes by which we have developed into an incorporated society with legal status and responsibilities, while—by the affiliation to the central body of the provincial branches, which were scattered over the country, and the consequent very large increase in our numbers—we have taken a much more important and influential position in the estimation of the public at large. We have also, since Dr. Sykes took office, started a journal of our own, which is second to no other sanitary organ in the kingdom—a journal which has already obtained a position of great public influence, and which, if it is continued upon the same lines as those adopted by its two successive editors, will increase in power and importance as time goes on. In these things, as in the general business of the Society, Dr. Sykes has taken a leading part, and has continued his exertions to promote its success for several years; and now that he is resigning his secretarial office, we have felt that it is impossible for us to allow him to do so without taking advantage of the opportunity it affords us of offering him some mark of our appreciation of his work, not indeed, as being in any way remuneration for his services, but simply in recognition of what he has done for us. I have before me a salver and some pieces of apparatus—as to the selection of which Dr. Sykes's own wishes have been consulted—and I am sure that I express the feeling of everyone here when I say that in offering this testimonial for his acceptance, we also wish him in his retirement every happiness in his domestic relations and much success in his public work. (Applause.)

Dr. Sykes, in acknowledging the testimonial, said: It is exceedingly kind of you, sir, to have spoken of me in such highly appreciative terms. I feel that I hardly deserve them, although I have endeavoured to merit them. I may say that when I first heard of the intention of the society to give me a testimonial I felt highly honoured, but when I further heard that it was the intention of my friends and colleagues to present me with a testimonial, not from the funds of the society, but by their personal subscription, I not only felt honoured, but deeply touched. I feel that this Society is not merely a professional body, but a society of members working in the same cause, with a brotherly feeling and friendliness among its members—a feeling that I hope will ever increase. The small points you have mentioned of work that I have tried to do are not very large in their way, but I hope they will lead to great results in the future. I hope that those who have worked with me in this Society, and those who follow, will make it prosper. So far as my peculiar choice of testimonial is concerned, if with this lantern I can at any time be of use to the Society, if I can make its meetings more useful or interesting, I shall only be too pleased to do so.

The meeting then proceeded to consider the question of

Vagrants and the Dissemination of Disease.

The Hon. Secretary read the following letters:

Dr. Gore King, of Keswick, wrote:—

In a paper I read at the last meeting of the British Medical Association I suggested a ticket system as appearing to me the best way of meeting the difficulties of the case, the chief essentials being that every tramp should carry a card bearing his name and description, without which he should not be received at any casual ward or common lodging-house, and which, in case he was brought in contact with infectious disease at any such place, should be endorsed to that effect with date by the medical officer of health, so that, wherever he went he might be kept under supervision until the period of incubation was passed.

I think this plan would answer nearly all the purposes of enforced quarantine, and would be much less costly and present fewer practical difficulties, and I believe Parliament

would be more likely to sanction such a scheme as this than one which involved compulsory detention or compulsory revaccination.

Dr. C. J. Russell McLean, M.O.H. for Yeadon, Yorks, wrote:—

The district for which I act as medical officer of health is only a small one, and containing under 8,000 inhabitants, but as regards vagrancy it is an important centre. There were up to the end of last year no fewer than seven lodging-houses, but with a view to discouraging vagrants in the idea that the town is a sort of headquarters for them the Sanitary Authority have reduced the number of registered lodging-houses to three. The necessity for so large an accommodation for vagrants lies in the fact that our town is situate almost midway between the important centres of Leeds and Bradford, and also about equidistant from the town of Otley, where there is a workhouse and still greater attractions for vagrants, the workhouse not being the most popular resort amongst such travellers. The result of our somewhat central position between these places is, that we get perhaps more than our share of visits from vagrants, many of whom simply "stay the night" or the "week end."

In my annual report for the year 1887, during which period there were cases of small-pox amongst tramps in Leeds and Bradford (Sheffield epidemic), we had some difficulty with regard to the housing of vagrants, the lodging-house keepers refusing to put them up whenever they suspected the tramps came from either of the infected areas.

At that time I recommended "That some sort of registration or certification of vagrants having no fixed abodes should be adopted, showing where they last came from, etc., and without which they would be refused admission to any public lodging-house, especially during any serious epidemic" (this probably under police supervision).

Again, in my report for the year 1888, I made somewhat similar remarks, owing to the outbreak of typhoid fever in an adjoining township.

Again, in my third report for the year 1891, with regard to an outbreak of measles during the annual "fair" visit of the "travelling shows and caravans," I advised that "There should be health certificates (granted and signed only by the Medical Officer of Health) given to the owner of, or affixed to each caravan, when the owner leaves a town, so that at the next place visited a clean bill of health or otherwise can be produced for the guidance of the authorities there. As such attractions are chiefly patronised by children, the danger in many cases, as in this one, when measles was the prevalent disease, becomes greater. Of course, such a plan as this could only be sanctioned by the Local Government Board; but I consider there has been neglect of duty that an Act for this purpose has not been framed and placed amongst the many other Parliamentary Acts pertaining to the Public Health."

The following paper was then read:—

Vagrants and the Dissemination of Disease.

By Henry E. Armstrong, D.Hy., Medical Officer of Health for Newcastle-upon-Tyne, etc.

The introduction of small-pox into the Newcastle Workhouse in December, 1892, by a man on tramp, and the subsequent re-introduction of the disease into the same place and also common lodging-houses in the city by other tramps, gave rise to a great deal of trouble and some expense. The experience—by no means new—and the knowledge that other vagrants had in other places been the means of spreading the disease, gave rise to the desire to ascertain more about the matter. Hence the application in May of last year to the medical officers of health of the large urban districts for the particulars which are embodied in my report on "Small-pox and Vagrancy," which has appeared in the journal of this Society. The replies furnished in response to my queries yielded information the consideration of which cannot but create a strong feeling of the need of a prompt and energetic remedy for a gross defect in the present system of the administration of preventive medicine—viz., that which allows the broadcast spread of disease by vagrants.

From the returns of the Local Government Board, it appears that the first town affected with small-pox in the present epidemic was Dewsbury (in May, 1891). The source of infection there was not reported to me. In the same month the disease began in London, Liverpool, Birmingham, and Bristol. How it was introduced into the first two of these towns is not known to me; but it came to the two latter in the persons of vagrants. The next two urban districts invaded were West Ham and Croydon, infection in both cases having been first conveyed there by a vagrant. Passing over Southampton, into which port the disease had been brought by ship, and also Middlesborough, Wakefield, and Bath, from which I received no returns, I find small-pox was next introduced (also by vagrants) into West Bromwich and Hull; afterwards into Manchester (from which I have no information); then, again by a vagrant, into Cardiff. This was in December, 1891. Thus, in the first half-year of the epidemic, fifteen towns were attacked. Of the eight of those towns from which I received replies to my queries, seven had received their first infection by tramps.

In 1892 the disease slowly and steadily advanced, month by month, from town to town. By May, 1893, 107 or 108 of the 117 large urban districts reporting their infectious cases to the Local Government Board were invaded by small-pox, and the number of cases they yielded was upwards of 5,600. At the height of the epidemic—*i.e.*, about May last—the number averaged above 360 per week.

Of 63 towns invaded, the medical officers of health of which have been so good as to favour me with particulars, 37 or 59 per cent. had the infection primarily from vagrants. The disease was brought secondarily by vagrants into 36 towns, including some into which first cases had also been brought by the same class of persons. Such secondary infections occurred as often as nine times in Carlisle, Southampton, and Sunderland, 12 times in Warrington, 15 times in Keighley, 18 times in Blackburn, and no less than 25 times in Nottingham!

In 19 instances only out of the 63 towns reporting was small-pox infection stated to have been brought otherwise than by vagrants, and in

seven of these it was subsequently re-introduced by vagrants no less than 25 times.

The epidemic is still going on.

Tramps bring their infectious diseases either to workhouses or common lodging-houses. According to the returns on which my report is based, in the above mentioned instances infected vagrants were housed 31 times in the former and 80 times in the latter. Each of those lodging-houses gave infection to an average of one case in the same house, but to how many other persons it is impossible to say.

In Blackburn, where the workhouse was infected with small-pox five times, and lodging-houses four times, there had been 56 cases of the disease by the end of May last. In Halifax, where small-pox had been brought to lodging-houses six times, infecting in these 19 other persons, the number of cases in the town in little more than a year from the date of the first one, was 360. In Warrington, where the disease was brought to both workhouse and lodging-houses by tramps, the number of cases in the borough in the first year was 598.

The majority (44 in 73) of the medical officers of health have recorded their opinion that it is desirable that during the prevalence of small-pox or other epidemic disease all vagrants, before leaving a workhouse or common lodging-house, should be compelled to report their next place of destination to the master or keeper of such house. The compulsory detention during possible incubation of disease, together with disinfection during epidemic times—and, in case of small-pox, the re-vaccination—of vagrants in workhouses and lodging-houses is advocated by 56 of the 73 medical officers of health responding to my inquiry on that point.

Several medical officers of health make suggestions as to other practical measures to be taken with the object of preventing the spread of infectious disease by the class of persons under consideration. These are so valuable that I make no apology for repeating the following summary of them from my report :—

QUESTION NO. 11.—What other steps, if any, would you suggest should be taken with the view of preventing the spread of small-pox or other infectious diseases by vagrants?

The replies may be summarised as follows :—

1. Where an epidemic is prevalent it should be possible to prevent vagrants visiting the district, and to arrest them on infringement of this condition.
2. Only a county medical officer of health can deal with diffusion of disease through a county.
3. Vagrants should be systematically examined on entering the union.
4. Strict inspection should be maintained, with history of routes travelled.
5. Make compulsory the medical inspection of all vagrants with the view of discovering mild cases which might otherwise escape notice.
6. Attend closely to the common lodging-houses, especially by night.
7. Each common lodging-house should provide a free bath, and each vagrant should have fresh water.
8. Common lodging-houses might be closed for a time.
9. The establishment of model lodging-houses in towns should be general.
10. Sanitary authorities and Poor Law and union authorities should be compelled to provide means of isolation.
11. Adopt the separate cell system at all unions.
12. Vagrancy should, as far as possible, be prevented, say, by retaining all tramps who enter workhouses for a fortnight, and compelling them to work whilst there.
13. Vagrants should be detained under observation.
14. The medical officer of health should keep a spare room for suspected vagrants.
15. Suspicious cases should be isolated immediately.
16. Vagrants should not be allowed to infest the crowded precincts of police stations for orders for admission to the workhouse. If the police continue to give these orders a separate place should be provided for the purpose.
17. Every vagrant should be re-vaccinated; better still, everyone else.
18. Re-vaccination of all vagrants lodged in a casual ward should be compulsory. If they had the choice between being re-vaccinated or doing their task they would, in the majority of cases, prefer the former.
19. Vagrants should be allowed to travel about on ticket or pass only.
20. There should be communication with prisons, workhouses, common lodging-houses, masters of canal boats, etc., directing attention to prevalence of epidemic and local powers relating thereto.
21. More attention should be paid to the migratory habits of other persons than vagrants.

Vagrants, as a class, occupy a specially dangerous position with regard to their means of spreading infectious disease. They come and go where they please unquestioned, and are accountable to no one in this respect. I know of two tramps who, whilst infected with small-pox, visited a casual ward where they were bathed in water used by ten other persons.

Vagrants are of two kinds—the professional and the occasional. The former is lazy, idle, and good for nothing. The latter is seeking for work, and is therefore entitled to some consideration. The community derive no benefit from the professional vagrant. They cannot prevent his arrival or departure or trace his movements. On the other hand, they have to maintain him. Therefore they have the right to subject him to special regulations, in order to protect themselves from any evil he may do them. Their powers to this end are at present inadequate to the necessities of the circumstances under consideration.

Among possible difficulties in the way of carrying out of remedial measures is the objection that may be raised to compulsory re-vaccination. This point is, as regards the general question, of comparatively little importance. The great thing is, not to prevent the tramp catching disease, but to prevent him from giving it to others. Re-vaccination applies only to small-pox, but there are typhus and other infectious diseases, the infection of which he may carry from place to place.

The London County Council are now taking action to give effect to the proposal to convene a conference of the urban sanitary authorities of England and Wales for the purpose of considering the steps necessary to prevent the spread of infection by vagrants. An expression of the views of the Incorporated Society of Medical Officers of Health will be useful to that conference.

I therefore beg leave to move the following resolution :—

Infectious Disease and Vagrancy.—Preventive Measures.

'That the Incorporated Society of Medical Officers of Health consider it desirable—

"(1) That vagrants should be restrained in their powers of carrying infection about the country, especially in epidemic times.

"(2) That they should be made to report their movements.

"(3) That they should, when considered requisite, be subject to disinfection and detention for such time as the sanitary authority of the district in which they are may think necessary for the protection of the public health.

"(4) That in epidemic times all persons frequenting casual wards or common lodging houses should be medically examined on admission.

"(5) That sanitary authorities and the police should have power to detain for medical examination any vagrant found in any public place."*

The following paper was then read :—

VAGRANCY AND SMALL-POX.

By EDWARD SERGEANT, L.R.C.P., etc., M.O.H. Lanc. C.C.

It gives me great pleasure to add my testimony in support of Dr. Armstrong's views with respect to vagrancy and small-pox. The information on the subject which he has been able to obtain from various parts of the country will prove of great value. The remarks I have to make apply more especially to Lancashire and are the outcome of my official experience in that county. The suggestions I shall submit for your consideration seem to me practicable and desirable for restraining a danger which has assumed serious proportions. The health of the country is menaced by persons who tramp from place to place having no certain dwelling or not abiding in it. They escape the usual laws observed by good citizens and pay little attention to vaccination or the laws of health ; as a result, when small-pox is prevalent they fall a prey to the disease, and owing to ignorance or carelessness much distribution of the infection takes place among frequenters of their haunts before the sanitary authorities are able to discover the source of the mischief. I know that Englishmen have an objection to any interference with the liberty of the subject, but this feeling ought to give way in the case of vagrants who avoid all means of honest livelihood, preferring to attach themselves to a society like a parasitic growth.

Fortunately such pests have not entire freedom of action, for under an Act passed in 1824 relating to the punishment of idle and disorderly persons, etc., a vagrant "not having any visible means of subsistence and not giving a good account of himself" is liable to be deemed a vagabond and punished with imprisonment, "while an incorrigible rogue (not being a female) may also be punished by whipping at such time during his imprisonment." Why should the law not go further and say that vagrants shall not by their actions endanger the public health? The proposals for accomplishing this end have in many towns been more or less carried out with good effect, but general action is wanted and greater efficiency would be secured by a legal enactment.

In the administrative county of Lancaster the distribution of small-pox by vagrants during the past two years has been abundantly demonstrated, and the want of power to cope with the evil has been much felt.

The disease, after spreading extensively in Yorkshire during the early part of 1892, was introduced by vagrants into the Borough of Warrington, and from thence was distributed to Ashton-under-Lyne, Withington, Garstang (R), Warrington (R), and many other districts.

From the reports issued by the Lancashire County Boroughs further evidence is given of the important part played by vagrants in the spread of small pox, and in the majority of these boroughs outbreaks of the disease have been repeatedly ascribed to tramp origin. As mentioned by Dr. Armstrong, of the towns attacked with small-pox throughout England and Wales 58 per cent. had the disease first introduced by vagrants, and in 72 per cent. of the towns the disease was sooner or later conveyed there by persons of this class, and on the average of five times to each town. In a recent report on the prevalence of small-pox in Salford during the years 1892-3, Dr. Paget states that the first case of the epidemic was a vagrant from Stalybridge, and the infection was afterwards carried into the borough in a similar manner on seventeen occasions; while Warrington—1892-3—suffered thirteen times from the tramp conveyance of small-pox.

In the administrative county of Lancaster during 1892, 612 cases of small-pox broke out in 28 districts, including 6 boroughs, 16 urban and 6 rural districts, and in one-third of them the disease was primarily introduced by vagrants, or by frequenters of common lodging-houses. To the end

* The above resolution is given in the amended form adopted by the mover on the suggestions of Drs. Sergeant, Newsholme, and Sykes.

of the past year 1,000 cases have been reported from 76 districts, 15 being boroughs, 48 urban and 13 rural.

Of the total districts attacked during the two years, 30 per cent. attribute to vagrants the responsibility of conveying the infection.

Frequently the disease first appeared in the common lodging-houses, and on becoming known the other lodgers, as a rule, disappeared without waiting to hear the wish of the sanitary authority as to precautionary measures, and in this way infection was conveyed from district to district.

Many workhouses and tramp wards have been attacked with small-pox; and vagrants, while suffering from advanced symptoms of the disease, have been discovered in the public thoroughfares.

The only power possessed by sanitary authorities over vagrants is by section 83, Public Health Act, 1875, which provides that the keeper of a common lodging-house, "in which beggars and vagrants are received to lodge," shall from time to time report to the local authority every person who resorted to such house during the preceding night. It would be better if sanitary authorities, on the outbreak of dangerous infectious disease, such as small-pox, could, by resolution, require the observance of the following additional provisions, viz. —

(*a*) That keepers of all common lodging-houses keep registers of persons resorting to such houses, and daily forward specified schedules to the local authority, such schedules to contain correct information in respect of the proposed movements of the lodgers enumerated.

(*b*) That the officers of the local authority, or police when requested by the local authority, exercise supervision over vagrants, and be empowered to detain any vagrant for medical inspection as to the state of his health, and when found to be unvaccinated or imperfectly vaccinated the public vaccinator be authorised to vaccinate him. If the medical officer of health should consider it necessary he may detain the vagrant in an isolation hospital when available, or, with the consent of the guardians, in a workhouse or tramp ward, and all reasonable expenses shall be paid by the local authority.

(*c*) That the officers of the local authority provide for the disinfection of the clothing or persons of vagrants if required, by reason of their having associated with infected persons, or on suspicion of their having so associated.

(*d*) That the medical officer of health on the outbreak of small-pox or other dangerous infectious disease in a common lodging-house, make an inspection of the lodging-house without delay, and have power to place the other lodgers under quarantine for a period specified by resolution of the local authority, and take any further precautions for preventing the spread of disease he may consider desirable.

It is suggested that any person without the permission of the local authority leaving such lodging-house or in any way contravening the above requirements, would render himself guilty of an offence punishable by fine or imprisonment.

Suitable payments might be made by the sanitary authority to the keepers of common lodging-houses for their daily lists of lodgers, and the vagrant would be responsible for the correctness of the statement concerning his destination. In case of quarantine the sanitary authority ought to pay the reasonable expenses incurred.

These provisions would be best carried out in the administrative counties under the supervision of the county councils than left to the small isolated authorities, perhaps not provided with a sufficient staff, or with any of the appliances required in the case of epidemic disease.

In addition to the above recommendations, I think it would be well if vagrants throughout the country were registered, as much valuable information would in this way be obtained for police and sanitary purposes. Each vagrant should be required to possess a certificate of registration, with particulars of place of birth, age, name, etc., and he should also be supplied after medical inspection with a health certificate. The vagrant would be required to produce these certificates on the demand of any police officer or sanitary official.

If vagrants were kept under strict regulation, as suggested, I feel satisfied that they would soon cease to be carriers of infection.

DISCUSSION.

Dr. WHITELEGGE thought they were all agreed as to the necessity of something being done with regard to vagrants, but he had not made up his mind what was best to be done. As to the system of registration, he could not see how any guarantee as to correct information was to be obtained. He thought it was undesirable that the supervision of casual wards should be performed by the county councils, that work ought to be in the hands of the local authorities. He could fully bear out, from the reports issued in his district, what had been said as to small-pox being brought in by tramps. He thought if they were going to the Local Government Board with any recommendations they might say something as to the isolation of infectious diseases in workhouses. In some cases tramps suffering from infectious disease were taken to the workhouse as a means of isolation—that was making the best use of the tramp system for spreading disease. Another particular point to which he wished to draw attention was as to tramps and common lodging-houses. If a sanitary authority found a case of small-pox had broken out in a common lodging-house, and they wished to isolate the patient, they could, of course, remove it, and they could, by voluntary arrangement, proceed further to quarantine the lodging-house. They would have to pay the expenses of the people there, and recompense the owner of the lodging-house, but in doing so they not only incurred some risk, but were certain to be surcharged by the auditor.

Dr. NEWSHOLME said the main point to be emphasized in any application for additional power was the power for the compulsory detention of vagrants; that seemed to him more important than revaccination. He thought the compulsory detention should come first, though they might in practice refrain from enforcing it when vagrants submitted to revaccination. He thought that the minimum period of quarantine should be eighteen days. In the present state of public

opinion it would not be politic to put revaccination before detention. They ought rather to go for compulsory detention. He had happily had very little experience of small-pox in his own district, but in one instance he had offered a number of vagrants, who had been lodged for a fortnight in the same casual ward as a small-pox patient, one shilling each to submit to revaccination, and the whole of them had consented.

Dr. PARKES thought that what they wanted to determine was what was practicable in the matter, and what the House of Commons would assent to; and it appeared to him that they had better adopt those measures which did not interfere with the liberty of the subject, as other measures would not pass through the House of Commons. That almost disposed of compulsory detention. ("No, no!") It appeared to him they might approach the Local Government Board and ask them to introduce an Amendment Bill to the Public Health Act, with a view to framing regulations similar to those they have for cholera, which they might put into effect when they thought fit. He thought they might adopt the ticket registration system. There was no great harm in that. Every tramp would be required to produce his ticket with his name and the place he last left, and the ticket would be signed by the keeper of the lodging-house, or the relieving officer if he came from a casual ward, and also by a medical man who examined him; and a note should be added if there was any small-pox or other infectious disease in the town he had left. He thought the regulations should provide for medical examination of all casual wards and commom lodging houses; similar regulations would apply to those adopted in cholera times. The district medical officer would be empowered to visit at night, and examine all people applying for beds, and any tramp who would not permit himself to be medically examined would be subject to a penalty or to imprisonment. It would, of course, be a considerable expense, but that they must not mind. Compulsory detention would not only interfere with the liberty of the subject, but would cause great difficulty. It would be necessary to provide accommodation for the detained. If a town had only one common lodging-house, and they used it, what would be done with the other tramps? If, on the other hand, they used the workhouse for the infected tramps, the disease would be likely to spread to the inmates and the staff. As to disinfection, there could be none if a man was in the incubation period, and if he was actually suffering from the disease there was already power to disinfect.

Dr. SYKES differed *in toto* with Dr. Parkes on one point, which was, that the proper course to pursue was what was expedient. It was the duty of the medical officer of health to point out what was right, throwing on the local authority the responsibility of refusing to act. He entirely disagreed with Dr. Parkes as to the powers of detention. It was just because they had not got those powers that all the trouble arose. If a person had small-pox in a casual ward or a common lodging-house next morning they would have the mortification of seeing other men, who had almost certainly been in close contact with the patient, simply walk out of the house, and they could not stop them. They wanted to be able to give presumably infected persons in charge there and then. Referring to compulsory registration, he could not see how they were going to prove identity. These tramps would "swop" their cards, and there was no means of proof. Revaccination might be an advantage, and it was possible to a certain extent. He presumed that in all districts there was now a nightly examination of all casuals. The very first thing he did when small-pox broke out was to petition the guardians to have a nightly medical examination, and that was still done. The result was, in three instances, within three minutes of a man coming in he was "spotted." What was required was to be able to give an order, and, if necessary, to instruct the policemen to take any man who had been in contact with a small-pox patient in charge if he dared to go out. Ninety-nine medical men out of 100 would say that anyone who had been in contact with a small-pox patient for 24 hours would be infected.

Dr. BANGAY: Is it to be supposed from the last speaker that the infection has taken place in the man's person or his clothes?

Dr. SYKES: Both. Both his clothes and he personally, and the remedy would be to keep him in charge until his clothes were disinfected and he revaccinated.

Dr. BANGAY: That being the case, of course, as far as infection from the person is concerned, there would be no danger until he had developed the disease, and as far as his clothes are concerned, how about medical men's clothes? They go from house to house and do not change their clothes.

The PRESIDENT: I do not think medical men are in the habit of remaining twenty-four hours with a small-pox patient.

Dr. REID thought that if they wanted anything done it would be necessary to go to the Local Government Board in very strong force, and it might be considered whether it would not be desirable to co-operate with some other society. The Local Government Board had the opportunity of obtaining the very best advice from their own medical staff, but did not apparently avail themselves of it, which was instanced by the fact that the inspection of lodging-houses was in the hands of the police, which often meant that a sergeant visited to ascertain whether any criminals were in the house, and that was all. They would have to get a great deal of reformation as to the inspection of lodging-houses, and it was a question whether they should not recommend that the police should have no authority over lodging-houses except for the detection of crime.

Dr. SANDERS was satisfied that no system of tickets would really be workable. With regard to the expediency of approaching Parliament on the question of detention, he thought they had an analogous case in the detention at home of children belonging to a family in which an infectious case occurred. It certainly was a much more serious matter to detain children from school, when school would be a benefit to them, than it would be to detain a tramp who apparently had no means of subsistence. A question which struck him was as to the definition of a tramp—did it mean only the occupiers of common lodging-houses and casual wards, or did it include carmen and sailors arriving in port; in fact, anyone who had no actual domicile of his own?

Dr. PARKES: I should like to point out, with reference to what Dr. Sykes said as to infected persons, if he is prepared to say the person is infected he has powers under the Public Health (London) Act already.

Dr. SYKES: You have to proceed by summons. It is true you can summon a man, but you cannot stop him. Even if a summons is made returnable the same day, the man may be six miles away when you have it.

The PRESIDENT: We have heard a great deal of small-pox in large urban districts. Now, I have twelve rural districts under my charge, and I have had small-pox introduced on several occasions by vagrants and by persons of the lower class of hawkers. These persons come into a district and stay for one, two, or three weeks, keeping themselves very much to themselves, so much so, that in one case a man was nearly dying before anyone knew he was ill. The question of expense is, I think, one that should not trouble us at all, because the expense of the medical inspection of these vagrants would be far less than that involved in consequence of the spreading of the disease. With regard to detention, my own feeling is that if there is any practical way of carrying it out it should be attempted. The ticket system would probably not be efficient. As Dr. Sykes has pointed out, the identity would be very difficult. Dr. Woodforde went on to suggest that if the motion of Dr. Armstrong was carried, it should be referred to a special committee for further consideration.

Dr. PARKES: Would it not be better to refer it to the committee first, sir, then they could go thoroughly into the matter, and bring up a scheme for the approval of the Society.

The PRESIDENT: As I understand Dr. Armstrong's motion, it would simply form a basis for the consideration of the matter by the committee.

Dr. SKINNER referred to the desirability of tracing the movements of the tramps backwards as well as forwards, and he referred to the institution originated by the police, called the "Mendicity Organisation," by which they requested people not to give vagrants money, and they supplied anybody who cared to have them with tickets, which they could give to these people, and which ticket would, on production at the baker's, procure them bread. It seemed to him this might be utilised as a means of tracing tramps The effect the system had had on the vagrant society in Dorset was most wonderful; the men really in want did not mind receiving these tickets, but the professional vagrant did, and consequently he cleared out of the district.

Dr. ARMSTRONG, in replying, supported Dr. Sergeant's proposal that lodging-house keepers should keep for the daily information of the sanitary authority registers of the lodgers visiting their houses, and would be glad if it were possible to have registration of details as to the movements, etc., etc., of vagrants. He accepted the suggestions of Drs. Sergeant, Newsholme, and Sykes amending his resolution. If it were carried he would propose that copies should be forwarded to the Local Government Board and the London County Council. He thought Dr. Parkes had failed in his attempt to 'dispose of the subject of the detention of vagrants" by raising the old cry against "the liberty of the subject." Dr. Parkes seemed to forget the possibility of a vagrant incubating disease whilst on tramp, and to overlook the chance of a wholesale stampede of lodgers from any house in which a case of small-pox, etc., appeared. The "ticket system" advocated by Dr. Reid was desirable. It would be well that such tickets should state whether there was infectious disease in the house or place from which the tramp came. In reply to the question of Dr. Sanders, tramps might be defined as persons without occupation, moving from place to place and staying at lodging-houses or casual wards. Such a definition would not apply to such persons as Lascars who come to a port in the capacity of sailors. He accepted with pleasure the suggestion of the President to refer his resolution to a committee.

A conversation took place at the close of Dr. Armstrong's reply as to the exact terms of the resolution, and ultimately, on the motion of Dr. THRESH, seconded by Dr. ARMSTRONG, it was resolved that it be referred to a committee consisting of the President, and Drs. Armstrong, Sergeant, and Whitelegge for report at the next meeting.

A vote of thanks to Drs. Armstrong and Sergeant brought the meeting to a close.

PROCEEDINGS OF THE BIRMINGHAM AND MIDLAND BRANCH OF THE INCORPORATED SOCIETY OF MEDICAL OFFICERS OF HEALTH.

A MEETING of the Birmingham and Midland Branch of the Incorporated Society of Medical Officers of Health was held on Thursday, January 11th, at the Council House, Birmingham. There were present: Dr. Boobbyer (president), Drs. A. Hill, Bostock Hill, Tew, Hollinshead, Bailey, H. May, Thursfield, Priestley, G. Reid H. Manley (hon. sec.), and Morton, with Mr. C. K. Millard (Birmingham City Hospital). Dr. Meredith Richards, of the City Hospital, Birmingham, was elected a member of the branch.

A SCHOOL OUTBREAK OF INFLAMMATORY SORE THROAT.

By GEO. REID, M.D,
M.O.H. to the Staffordshire County Council.

A short history of a school outbreak of sore throat, which came to my notice in the autumn of last year, may prove of interest, especially on account of its apparent connection with the opening of an old and filthy drain adjoining the schools question. Mr. Langley Webb, the medical officer of health of the Cheadle Rural District, where the outbreak occurred, very kindly called my attention to it, and it is with his approval that I am recording the facts, it being doubtful whether he himself could attend this meeting.

The first symptoms complained of were headache, feverishness, and pain on swallowing; on the second day the throat began to swell and become tender, and the patient felt too ill to get about; on the third day all the symptoms were aggravated, and, in addition to the throat symptoms, the lymphatics of the neck became swollen and tender; in some cases very much so, in others less so, but in all to some extent; in fact, so great was the swelling and tenderness in many of the cases, that the master of the school thought the patients were suffering from mumps until he was disabused of this idea by Mr. Webb, who was consulted only when the master's own family were attacked, about ten days after the first cases occurred. The throat appearances were those of ordinary follicular tonsillitis, and in none of the cases examined, either by Mr. Webb or myself, was there any trace of diphtheritic membrane to be found; neither was any rash apparent on the skin. About the fourth day the acute symptoms began to subside, but the tonsillar swelling and the enlargement of the lymphatics remained for some days after the patients were able to take ordinary food. There were no fatal cases, and none of the patients suffered from paralysis in any form.

It was not until ten days after the first cases occurred that Mr. Webb became aware of their existence, and he called my attention to them the following day, October 18th last, when I had occasion to see him with reference to another matter. I at once visited the school, and elicited from the schoolmaster the following particulars, which were verified by his assistants:—

About a fortnight previously the attendance in the infants' department of the school began noticeably to fall off; in fact, on the first day of this period twelve infants were absent, and each day afterwards a few others absented themselves. My visit took place on a Wednesday, and up to the Friday of the week before—that is to say, ten days after the first noticeable falling off in the attendance—the absentees were almost entirely infants. On the Monday, however (Saturday being a holiday), besides a very marked increase in the number

absent from the infants' department, a considerable falling off among children attending the mixed department took place, and it was found on inquiry that this also was attributable to throat ailments. Three days afterwards, owing to a continued decline in the attendance in both departments, the school was closed, the absentees on the last day numbering 68—namely, 31 mixed and 37 infants, out of a total on the books of 302, composed of 197 mixed, and 105 infants. In other words, the children absent from the infant department amounted to 35·2 per cent., and from the mixed department to 15·7 per cent. Bearing in mind that nearly a fortnight had elapsed since the first lot of children were attacked, and that each day fresh cases had occurred among children, most of whom, no doubt, had by this time returned to school, we may conclude that at least one-third of the entire school suffered. It is interesting to notice also that adults did not escape, for the whole staff of teachers, including the schoolmaster and his wife, the assistant mistress, and the pupil teacher, were attacked.

As regards the possible origin of the outbreak, two weeks previous to my visit, and two or three days before the first cases occurred, it was found necessary, in connection with certain additions to the school, to open an old drain at a point immediately under the windows of the infant class-room. This drain—which remained open for about a fortnight, but which had been sealed up previous to my visit—was found to be almost completely choked with foul deposit, and the smell which was given off from it was said to be most offensive—a circumstance which is not surprising, seeing that, in addition to the sink-waste of the school-house, the school urinals and privy cesspits were connected with it. Granted that septic throat affections may arise from drain emanations, and considering the fact that the infant class-room was in close proximity to the drain in question, and had no provision for ventilation except by open windows, it cannot be said to be stretching a point to attribute the outbreak of the disease to that cause. Again, if this be the true explanation, the order of attack is of interest, for it would seem that a certain number of children, the more susceptible possibly, contracted the ailment from the original source, and that the others were infected from them direct. This theory is also borne out by the fact that the infants were attacked in the first instance, and the affection did not attack the elder scholars, whose class rooms were situated some considerable distance from the open drain, until a week or so afterwards.

With the view of verifying, if possible, the accuracy of my theory that the affection, after being contracted in the first instance from the open drain, was communicated from person to person, I instructed my inspector to make a house to house inquiry in order to ascertain whether other cases occurred in the village, particularly in houses where the absent school children lived. The result of this inquiry may be said to be negative, although among 142 families visited 10 days after the closure of the schools, 37 fresh cases of throat ailment were said to have occurred, 29 in houses where school children who had suffered lived, and the rest in houses where there were no children attending school. Seven of the fresh cases occurred among adults and four of these in houses where there were no children attending school. As none of the reputed fresh cases had been attended by a medical man it was impossible to ascertain the exact nature of the illnesses, but Mr. Webb very kindly interviewed some of the people afterwards, and he came to the conclusion that the evidence of their having suffered from the particular ailment was, to say the least of it, doubtful; so that I have no absolute proof that the infection had been imparted to others outside the school by the children who previously suffered from it.

The outbreak I have recorded was a trivial one as regards the gravity of the symptoms, but on that account it is none the less interesting in an etiological sense. Again, it might have given rise to serious consequences, for if a case of diphtheria had chanced to occur in the school at this time, the contagion would have found a favourable field for its development, and many deaths would have resulted. There is a tendency at present in some quarters to minimise the risk attending insanitary conditions, and to doubt the evidence upon which sanitarians have based their arguments in advocating improved house drainage and more cleanly general surroundings; it is most desirable, therefore, that publicity should be given to any facts bearing on this question which come to our notice.

Discussion.

The PRESIDENT said that he had been greatly interested by listening to Dr. Reid's paper, the more so because this subject of infective sore throat in its pathogenic aspects was at the present time attracting great attention. One of the most experienced medical men in Nottingham asked him to come and see certain cases with him which were of an extremely doubtful character. There had been two deaths without the formation of membrane in either case. They did not know whether to accept them as diphtheria or not, but eventually they escaped from the difficulty by saying simply, "septic sore throat." In PUBLIC HEALTH a very good suggestion had been made that the term "diptheroid" should be used. The relative percentage of attacks under the age of five and from five to ten given by Dr. Reid corresponded very nearly with the percentage that was usually given of the mortality from diphtheria, namely, 5·54 per cent., with an additional 30 per cent. between five and ten. That in itself was suggestive. In looking at these epidemics he was often reminded of what Dr. Thorne Thorne had said, that before a general outbreak in a rural district one often got a series of cases like those under discussion, cases which were attributable to the state of the drains.

Dr. THURSFIELD said that he understood that none of the cases showed any symptoms of paralysis subsequently, or at any time. He thought that no importance should be attached to the absence or presence of a membrane, as this

led to a great deal of confusion. Practitioners always seemed to have before them that idea of diphtheria meaning a membrane. It had been suggested that they should do away with the term diphtheria and go back to the old English term, contagious sore throat. His opinion had been that drain emanations, damp houses, and sitting with wet feet had always had a tendency to produce diphtheria by producing conditions favourable to the incidence of diphtheria. Conditions such as Dr. Reid had described might invite diphtheria, but it was not in accordance with experience, he thought, that what was commenced as a drain sore throat should become infectious apart from cases of actual contagious sore throat.

Dr. PRIESTLEY commented upon the absence of membrane and paralysis, and asked whether any epidemics of diphtheria had been notified in the district lately. He was perfectly satisfied that membrane did not occur, roughly, in more than 25 per cent. of the cases; but cases had occurred in which the membrane had been found in a post-mortem examination at the top of the nose, so that possibly in many cases where no membrane was observed it was because it was cut of sight. His own impression was that the drains had given rise to the conditions described, but he could hardly believe that drain emanation *per se* would give rise to infectious disease.

Mr. HOLLINSHEAD said that cases of a similar kind might be taken very often for diphtheria, because in many instances the rash was hardly discernible, and yet really they might be cases of mild scarlet fever. He quite agreed with Dr. Thursfield that there might be diphtheria without a membrane. There were, however, he believed, many cases notified as diphtheria which were not diphtheria. He should be inclined to regard cases without a distinct membrane as non-diphtheritic.

Dr. BOSTOCK HILL said that actual pathological observations had distinctly and definitely proved that many cases of diphtheria had existed without there being the slightest membrane as far as the eye could see. On the other hand the prevalence of membrane was always associated with a very high mortality. The discussion was important because as medical officers of health how were they going to diagnose what had been called "half-crown diphtheria" from true but non-membranous diphtheria. Were they to wait for paralysis to determine the diagnosis, or were they at once to treat the house as infected? This question of "What is diphtheria" was also allied very closely to the questions raised by Dr. Thursfield, who asked whether Dr. Reid considered that diphtheria as a true infectious disease could originate from drain emanations. Might they not ask "Is diphtheria a disease produced, at all events in some instances, from progressive degenerations of sore throat?" If so they could get an infectious disease known as diphtheria from drain conditions. He quoted cases showing that there might be a large amount of diphtheritic membrane that could not be discovered even on careful inspection.

Dr. REID stated, in answer to Dr. MAY, that none of the cases in this outbreak were notified as diphtheria.

Dr. A. HILL said that cases like those Dr. Reid had brought before them formed a valuable link in the chain of evidence. He (Dr. Hill) was one of those old-fashioned people who believed that diphtheria was caused by drain air, or, at all events, that drain air was essential to the development of diphtheria. What part it played he was not in a position to say. Even a sink-drain—a length of pipe of that small extent—could produce harm. Every pipe that received organic material was a possible source of putrescence, and the putrescent vapour inhaled might produce diphtheria. Some twenty years ago in his own house they all began to get diarrhœa very slightly, everybody in the house being affected except one servant. He found there a housemaid's sink that had been put in about three weeks before, and down which the bed-room slops were thrown. Before this was put in there was no disease in the house. Through the overflow of the bath, which was connected with the discharge pipe of the housemaid's sink, there was a gentle in-coming current of air. From the time this condition was remedied the diarrhœa ceased. If that infinitesimal proportion of urinal putrescence could produce diarrhœa in a whole household, was it too much to expect that they would get septic sore throat from more serious emanations of this character? The point of Dr. Reid's paper was the importance of paying attention to all emanations from drains. Care should be taken that besides being cut off from the sewer, sinks and other drains should be trapped at the upper end, so that nothing could be picked up from the lining of the tube by air drawn into the warm house.

The PRESIDENT said that they were constantly hearing intelligent laymen pouring contempt upon the statement of medical men that drain effluvia was capable of giving rise *de novo* to all sorts of complaints of a septic character, as diverse as septic sore throat, diarrhœa, and pneumonia. About two months ago he was witness of an example 150 years old of the ill-effects of opening a bad drainage system. One of the oldest parts of Nottingham was the High Pavement, the part where the old county prison was. Opposite, and a little to the west, was the Judges' lodgings. There was known to be an old system of drainage there, but no one had ever investigated it. No one had any right of entry into the place on behalf of the borough, it being county ground, although within the borough boundary. Some little time ago Mr. Justice Hawkins, while in bed in the small hours, noticed a horrible odour coming up under his bed. He called for the Clerk of the Peace, had him called out of bed, and, saying "This house is not fit to sleep in," made him find fresh lodgings. The county surveyor came in next day, and, in co-operation with him (Dr. Boobbyer) went through the old building. They found some of the finest materials for a lecture on sanitation he had ever met with. He had never seen anywhere else such a collection of anachronisms as were gathered together in that small area. But although her Majesty's Judges had been accommodated there for a long series of years, although the caretakers had lived there and had changed from time to time, and enormous number of people had lived in the building or had been there on various errands, there had never been a sufficiently marked instance of disease of such a character as to draw attention to the unsatisfactory condition of the drains, until Mr. Justice Hawkins found it out by his olfactory perception. But when the drains were opened there was a series of attacks, and no fewer than four deaths among the County Council of Nottingham were directly traceable to going upon the ground at this time. Three days after standing over a huge cesspool in the basement, one of these four began with septic pneumonia of a fatal type.

Dr. REID said, in reply to the questions by Dr. Thursfield and others, he would say that he fully agreed that there were constantly occurring serious cases of undoubted diphtheria, with a large percentage of deaths, in which no membrane occurred, and cases contracted from membranous diphtheria and developing into disease which was not diphtheria as far as membrane was concerned. This showed that there were a large number of cases which did not present the ordinary appearance associated with the disease and yet were true diphtheria. Dr. Thursfield did not think that any emanation from a drain could produce an infectious sore throat.

Dr. THURSFIELD: I scarcely expressed that opinion. I wish to gather your opinion.

Dr. REID said that that was scarcely his opinion. People always rushed to the conclusion that all affections of the throat of this character were diphtheria, but he did not see why there should not be other diseases of an infectious nature affecting the throat, but not to be classed as diphtheria. These diseases arising from drain emanations might still be due to a specific poison. Undoubtedly there were conditions producing susceptibility which led to epidemics of diphtheria, and so with scarlet fever. There was no rash whatever on any of the children during the epidemic he had described, neither had there been any since. The Notification Act was in force, but there was no diphtheria notified in the district. In reply to Dr.

Priestley, he would say that in his opinion drain emanations might produce a throat affection which could be imparted to others who were away from the source of the disease. That was his reason for calling special attention to the fact that the disease had attacked the infants a week before it appeared among the elder children. The cases were entirely free from suspicion of scarlet fever, and there was nothing to connect the milk supply with the epidemic, which was entirely confined to the school children. The patients came from all parts of the village, and it was conclusively a school epidemic.

Notes on the Notification of Erysipelas and Puerperal Fever.

By Henry May, L.R.C.P., M.O.H. Aston Manor.

He said his remarks on erysipelas would only apply to the policy of keeping it among the diseases whose notification was compulsory. He believed the chief reason for so placing it was because of its association with puerperal fever and with vaccination; but according to his experience, its usefulness in those directions was theoretical only. There had been 83 notifications of erysipelas in Aston Manor during 1893, or more than an eighth of the whole, and attended with three deaths. He had instituted inquiries in them all, but no action had followed in any.

If the notification of infectious diseases should be made compulsory generally by future legislation, it should not be "loaded with useless diseases, and he moved that in any farther legislation on the subject, this branch considered it desirable that erysipelas should be placed among those diseases the notification of which it was optional with sanitary authorities to adopt."

No question was likely to arise as to the advisability of the notification of puerperal fever being compulsory, although it was a difficult and delicate subject to discuss. The term was vague, and the practice of medical men in applying it various, as well as the custom of medical officers of health in accepting and requiring its notification. He narrated some of his experiences during the past year, and hoped the Fellows present would help to formulate some definite procedure in regard to the notification of child-bed fevers and inflammations, such as "childbirth, peritonitis"; as to the omission of notification in deaths from puerperal metritis and peritonitis; and as to deaths from these causes or septicæmia, registered without mention of childbirth; all of which he had met with during the past year. He instanced a fatal case from "childbirth metritis" not notified, almost immediately followed in the practice of the same medical man by two fatal cases of puerperal fever, notified as such after considerable delay; also a fatal case of puerperal fever, duly notified, attended by the midwife of an institution, followed by a fatal case of metritis, four days; peritonitis, two days," which he found, on inquiry, was a childbirth, attended by the same midwife, and the death certificate was by the medical officer to the institution. A correspondence followed, ending with a reference to the editor of the *British Medical Journal*, whose opinion was (see *Brit. Med. Jour.*, Feb. 1893, page 269): "Douht may occasionally arise, perfectly legitimately, as to the scope of the term 'puerperal fever,' but scarcely in instances where fatal 'metritis and peritonitis' supervene upon parturition." He said that the amendment of the death register by a medical man, where "childbirth" had been omitted from the certificate, was a difficult matter to accomplish, as the Registrar-General required an affidavit from two persons to effect it. There had been four other deaths in his district during the year in women at childbearing age from peritonitis, as to which he had no information whether it was associated with childbirth.

He thought no line of demarcation was possible between septicæmia, metritis, or peritonitis in childbed and puerperal fever, and they ought to be notified as cases of puerperal fever. When death occurred from any of these causes, and no notification had been received, the medical officer of health should call attention to the omission, and when the occurrence of childbirth in connection had not been mentioned, inquiry should be made with the same object. If a notification of puerperal peritonitis or metritis was received, he should refer it back to the medical man with an intimation that it must be framed in the terms of the Act, or refused.

After a discussion, in which the President, Dr. Bostock Hill, Mr. Hollinshead, Dr. A. Hill, Dr. Thursfield, and Dr. Meredith took part, Dr. May gave the following notice of motion for the next meeting: "That, in the opinion of the Birmingham and Midland Branch of the Society of Medical Officers of Health, it is desirable (in the event of any further legislation with regard to notification) that erysipelas should be included amongst the diseases the notification of which is optional with sanitary authorities."

It was announced that the next meeting would be held at Leicester.

PROCEEDINGS OF THE NORTHERN BRANCH OF THE INCORPORATED SOCIETY OF MEDICAL OFFICERS OF HEALTH.

The second annual meeting of this branch was held on December 15th, 1893, in the Council Room of the College of Medicine, Newcastle upon-Tyne, when the following members were present: Dr. Henry E. Armstrong (in the chair), Drs. Arthur, Liston, Wood, Stainthorpe, Murray, Stokoe, Turnbull, Oliver, Boustead, Gibbon, Mitchell, Gofton, Park, Skrimshire, and Eustace Hill (hon. secretary). Dr. Maclean Wilson, of the Local Government Board, was also present.

The minutes of the last annual meeting were read and confirmed.

A telegram was read from Dr. C. S. Hall,

Carlisle, regretting unavoidable absence from the meeting; also a letter from Dr. Spurgin, withdrawing his resignation of membership.

The HON. SECRETARY read his annual report:

HON. SECRETARY'S ANNUAL REPORT.

It gives me pleasure to lay before you the second annual report of this branch since the record of the past year's work and the finances are both satisfactory. The progress of the branch is also marked by an increase in the membership of 12, the members now numbering 46, and by a larger average attendance at the meetings than in the previous year.

Including the last annual meeting, four branch meetings have been held, two of which were in Newcastle, and one each in Darlington and Sunderland. The annual provincial meeting of the Society was also held in Newcastle during August, under the auspices of this branch, and was well attended, both by members of this branch and of the Society, its success being in great measure due to the energy of our president, who acted as chairman of the meeting.

There have also been three meetings of the Council of the branch. The following papers were read and discussed at the various meetings:—"External Organisms as a Cause of Disease," by Dr. Liston, M.O.H. Southwick; "The Unqualified Medical Practitioner from a Public Health Point of View," by Dr. Eustace Hill, M.O.H. Durham C.C.; "Small-pox and Vaccination," by Dr. Vann, M.O.H. Durham City; and, read at the provincial meeting, "The Influence of Food Adulteration on Health," by Dr. Alfred Hill, M.O.H. Birmingham.

Important resolutions were passed by the branch with regard to "uncertified deaths," the enforcement of the vaccination laws, the restriction of the movements of tramps during epidemic periods, etc., etc., and several informal but none the less interesting discussions were held on various subjects at different meetings of the branch.

The following new members were elected during the year: Professor Philipson, Newcastle; Professor Oliver, Newcastle; Dr. Wood, M.O.H. Sunderland; Dr. Turnbull, M.O.H. South Shields; Dr. Squance, M.O.H. Sunderland R.S.D.; Dr. Clarkson, M.O.H. Morpeth R.S.D.; Dr. Skrimshire, M.O.H. Morpeth; Dr. McCullagh, M.O.H. Bishop Auckland; Dr. Stokoe, M.O.H. Gateshead; Dr. Smith, M.O.H. Brandon; Dr. Scurfield, Sunderland; and Dr. Todd, Sunderland.

The proceedings of the branch have been regularly published in the official paper of the Society, PUBLIC HEALTH.

There is a balance in hand to the credit of the branch of £5 18s. 11d., and judging by the large number of new members nominated for election, there is every indication that the progress and prosperity of the branch will be more than maintained during the ensuing year.

It will greatly assist the hon. secretary if members desirous of giving papers or of introducing matters of public health interest at meetings of the branch will communicatewith him without delay.

(Signed) T. EUSTACE HILL,
Hon. Sec.

The Hon. Treasurer presented the following statement of accounts for the past year:—

STATEMENT OF ACCOUNTS FOR THE YEAR ENDING DECEMBER 6TH, 1893.

Dr.	£	s.	d.
To balance brought forward from previous year...	2	15	7
,, one outstanding subscription	0	5	0
,, forty-one annual subscriptions, 1892-3 ...	10	5	0
	£13	5	7

Cr.	£	s.	d.	£	s.	d.
By printing, etc.—						
Caldcleugh	2	11	0			
Simpson	0	3	6			
				2	14	6
,, postages, telegrams, stationery, etc.				1	18	4
,, caretaker's gratuities				0	7	9
,, hon. secretary's travelling expenses, etc. ...				2	6	1
,, balance in hand				5	18	11
				£13	5	7

T. EUSTACE HILL, Hon. Treasurer.
JAMES ARTHUR, W. W. STAINTHORPE, } Auditors.

The report of the Council of the branch, held October 27th, and recommending that the following members should form the council for the ensuing year, was unanimously adopted:—

President—Dr. Henry E. Armstrong.

Vice-President—Dr. C. S. Hall.

Hon. Sec. and Treasurer—Dr. Eustace Hill.

Members of Council—Drs. D. S. Park, Gofton, Frazer Hurst, Boustead, J. C. Wood, Turnbull, Duncan, and Squance.

On the motion of Dr. Eustace Hill it was resolved that the bye-law of the branch relating to the election of new members be altered to read as follows: "Candidates for election as members, associate members or associates, shall be nominated by written notice to the president or the hon. secretary by two members, at least fourteen days before a meeting of the branch, and shall thereupon be eligible for election at such meeting. The election may be decided by a show of hands, but if desired by any member present shall be conducted by ballot. The names of the candidates shall be announced in the notice convening the meeting at which the election is to take place, at least seven days before such election, and no candidate shall be elected unless four-fifths of those voting shall be in favour of his election."

The following gentlemen were elected to the branch:—

As Members.

G. H. FITZGERALD, M.D , M.O.H. Castle Ward R.S.D.
P. BUTLER STONEY, M R.C.S., M.O.H. Millom U.S.D.
N. HARDCASTLE, M.R.C.S., M.O.H. Benwell and Fenham U.S.D.
R. ANDERSON, M.D , M.O.H. Cramlington U.S.D.
W. H. SPURGIN, M.R.C.S., late M.O.H. Maryport U.S.D.
G. R. SHERATON, L.R.C.P., M O H. Sedgefield R.S.D.
D. JACKSON, M.D., M.O.H. Hexham U.S.D.

As Associate Member—

GEORGE R. MURRAY, M.B., Newcastle-on-Tyne.

The following gentlemen were nominated for election at the next meeting of the branch :—

As Members—

J. B. FISHER, M.B., M.O.H. Whitehaven.
A. W. ATTWATER, L.R.C.P., M O.H. Whickham U.S.D.

As Associate Member—

F. W. GIBBON, L R.C.P , B.Hy., South Shields.

As Associates—

ALD. H. W. NEWTON, L.F.P.S., J.P., Newcastle-on Tyne.
ADAM WILSON, L.R.C.P., Newcastle-on-Tyne.

THE BACTERIOLOGICAL DIAGNOSIS OF CHOLERA.

Dr. H. E. ARMSTRONG, in introducing the subject, said his object was not to deny the claim of bacteriologists, but to inquire into it and test its truth for practical purposes. During the recent epidemic several cases appeared in Newcastle, which were declared on bacteriological examination to be Asiatic cholera. His sanitary authority, on receiving his reports on these, had wished for his own definite statement as to whether the cases were or were not that disease, but he had more than once declined to commit himself to a definite opinion. The bacteriological test of cholera was admitted as proof at head-quarters, and therefore he was bound to act on it. But for all that he could not implicitly and without hesitation give it his entire acceptance. This was, he believed, the position in which others like himself were placed. Bacteriologists have constituted themselves a court of judgment beyond which they admit of no appeal. The December number of *The Practitioner* stated the case from a bacteriologist's point of view. One paragraph from the article* in question was as follows : "There occur not a few attacks of illness seemingly destitute of relation with antecedent cholera, and presenting perhaps symptoms by no means characteristic of that disease, but which, nevertheless, are affirmed by the bacteriologist to be unquestionable examples of true cholera." . . . . The question at issue is, "Has the bacteriologists' diagnosis of cholera to entirely supersede the medical one?" The statements made by bacteriologists are very positive. Are they to be received without question? Thus, Koch's comma bacillus is described as absolutely the only true means of diagnosing Asiatic cholera. The article quoted contains the translation of a paper from the pen of Professor Koch, who says of the bacillus that its "appearance proves with unfailing certainty the presence of the disease."

*"Cholera in England : Its Bacteriological Interpretation."

And again : "Everyone must agree that in every case where these bacteria occur Asiatic cholera must be present." With regard to the well-known signs by which the bacilli of cholera may, he states, be recognised with equally "unfailing certainty" (staining, cultivations, cholera-red reaction, and experiments on animals), what proof is there that these characters are monopolised by the bacteria in question? Several of these signs (*e.g.*, the bacilli forming themselves into "characteristic groups," like a shoal of fish heading up-stream, their struggle to the surface for breath, their "characteristic colonies" on gelatine, etc.), considered singly, are weak links in the chain of evidence. Taken altogether, the entire group would scarcely be accepted in a court of law as conclusive proof on so important an issue. The best of them—viz, that of experiment on animals—is so hedged in by Koch's requirements as to be capable of but limited application. No reference is made by Professor Koch, in the paper above mentioned, to stab cultures and liquefaction of gelatine. Is this test now discarded?

In the past bacteriologists have not always been free from error, neither are they always agreed. At one time they described the bacillus as the contagium of disease; then they told us it was the vehicle of contagium ; now they say it is its manufacturer. Are they unanimous to-day on the subject of Koch's bacillus of Asiatic cholera and its alleged properties? Was not that bacterium known as a "comma" not long ago, and is it not now called a "spirillum"? Have we not in the phrase "indistinguishable from Asiatic cholera," so often used on high authority last autumn, an acknowledgement of doubt as to the reliability of the bacteriological method of diagnosis?

With respect to diseases other than cholera, the bacteriologists have not always proved their case, as, for instance, with regard to "scarlet fever in the cow," or the curative action of tuberculin. They should not, therefore, be too positive, too oracular, or too ready to take things for granted. It is much to be wished that they would work less persistently on old lines, and develop more originality in their methods of investigation.

DISCUSSION.

Professor GEORGE MURRAY pointed out that there was very strong evidence to show that the spirillum of Asiatic cholera was the real cause of that disease. The comma bacilli were found in all cases of cholera and not in any other disease ; they could be obtained in a state of pure cultivation outside the body, and under suitable conditions were capable of causing the disease in animals. Several cases had occurred in which typical attacks of cholera in man were brought on by swallowing the bacilli which had been found to be present in the stools of these persons in large numbers. He then briefly described the charac-

teristics of the bacilli, and pointed out the importance of a bacteriological examination of the stools of all suspected cases of cholera. He then gave a description of the present method of examining stools for the cholera bacilli as recommended by Koch. (For details *vide* "Notes on Asiatic Cholera," by author, in *Northumberland and Durham Medical Journal* for January, 1894.) The systematic examination of the stools of suspected cases of cholera had shown that there were a large number of very slight cases of cholera which ended favourably. It had frequently been observed that during cholera epidemics a large number of cases of diarrhœa occurred, and the probability was that many of them were real cases of cholera in a mild form. This fact was illustrated by figures taken from the record of the 1853 epidemic of cholera in Newcastle. With regard to the future there seemed little chance of cholera becoming epidemic in towns which derived their water supply from a high gathering ground free from contamination. If that supply was supplemented by water drawn from a stream liable to contamination then there was danger. If cholera gained a footing in the country there was much danger to small towns and villages which were supplied by water from small streams liable to pollution. The great prevalence of enteric fever in the county of Durham in such rural districts during this autumn was a good index of how cholera might spread.

Dr. STAINTHORPE said that although diarrhœa was frequently prevalent during epidemics of cholera, the former disease was often extremely prevalent, as during the past summer, in the absence of cholera, and it should not be argued, therefore, that cases of diarrhœa during cholera epidemics were mild cases of cholera, but rather that the causes which tended to the production and spread of diarrhœa were also favourable for cholera. He had during the summer seen several cases of acute diarrhœa, the symptoms of which were almost identical with those of Asiatic cholera, and during an epidemic of cholera would certainly have been regarded as suspicious of that disease, though in reality they were nothing of the kind. He was not yet satisfied that the diagnosis of cholera could be absolutely determined by bacteriological examination of the dejecta.

Dr. PARK also remarked on the similarity between the symptoms of bad cases of summer diarrhœa and those of cholera, and thought it by no means proved that the comma baccillus was the sole cause of Asiatic cholera.

Dr. MACLEAN WILSON, referring to cases where cultures of the comma bacillus had been swallowed with apparently no bad results, asked how such experiments were to be reconciled with the theory that the comma bacillus was the cause of Asiatic cholera.

Dr. EUSTACE HILL said he thought Professor Koch had satisfactorily answered the question asked by Dr. Wilson by the results of his investigations during the second cholera outbreak in Hamburg, when the disease broke out among the crews of some ships lying in the harbour. As soon as the first cases occurred, not only was a bacteriological examination made of the dejecta of those affected by the disease, but the stools of all sailors and others who it was known had drunk the river Elbe water—which at that time was receiving cholera-infected sewage—were also bacteriologically examined. The comma bacillus was not only found in the excreta of those patients suffering severely from cholera, but also in those of persons who had no symptoms except of slight diarrhœa, and it was also found in the stools of persons who had drunk the unfiltered water, but who were absolutely without any of the symptoms of cholera. The bacillus could not, however, be found in any instance in the excreta of persons who were similarly circumstanced as to mode of life and surroundings, but who had not drunk the river water; and in a most convincing manner Professor Koch argues that only a certain proportion of those who ingest the cholera virus are really susceptible to the disease, and that the comma bacillus in many cases passes through the body without producing any effect, or, at any rate, only slight constitutional disturbance. No one can read the series of articles published by Dr. Koch on cholera without being impressed by the accuracy of his experiments and the soundness of his deductions; but at the same time it is extremely difficult to understand the etiology of many of the cases of supposed Asiatic cholera in this country during the past summer. From Ashbourne, a village in a rural district in Derbyshire, from South Shields, and from other places, cases were reported which, as a result of a bacteriological examination by experts, were either stated to be Asiatic cholera or "indistinguishable from true cholera:" and yet it was impossible to trace the slightest connection between these cases and any previous case of Asiatic cholera, and at Ashbourne, at any rate, the cases appear to have arisen from local insanitary conditions. Such cases would seem to suggest that either our knowledge of the etiology of cholera is still imperfect, or else that the comma bacillus or spirillum, which is supposed to be diagnostic of that disease, is only its accompaniment and not its real cause. It could not be denied, however, that bacteriology, though still in its infancy, had been the means of greatly improving our knowledge of the causation and prevention of disease, and it was to that branch of sanitary science to which we must look in the future for further elucidation in that direction.

After some remarks by Dr. GIBBON and Dr. GOFTON,

Dr. ARMSTRONG, in replying, said: Professor Murray, in his opening remarks, had used the words, "Koch has laid down four positions." . . . "Koch says," etc., thus confirming some of his (the speaker's) propositions. The appearance and behaviour of tuberculous bacilli are no criteria as to those of cholera. Pettenkofer swallowed the latter without harm. The eating of cultivations from human excreta, of which Professor Murray had spoken, was a peculiar indication of enthusiasm! Professor Murray had given a description of the processes of bacteriological investigation, but no reasons why we should rely on them as diagnostics. The clinical symptoms of cholera may, perhaps, not be sufficient for a diagnosis, but neither are the bacteriological points, as stated, sufficient. Medical officers of health are glad of help from bacteriologists, but they want logical grounds, not mere *ipse dixits*. What would be the practical outcome, if adopted, of the theory put forth that a person may be voiding the bacilli of Asiatic cholera and yet not be aware that he has anything the matter with him? Why, that in epidemic times, the bacteriologist will have to examine every stool of every person in the country!

On the motion of Dr. HILL, seconded by Dr. PARK, a hearty vote of thanks was passed to the President and Council of the University of Durham College of Medicine for granting the use of the Council Room for the meeting, after which the proceedings terminated.

The annual dinner of the branch was held after the meeting at the Douglas Hotel, Newcastle-on-Tyne, when twenty-one members were present, including, in addition to those at the meeting, Professor Philipson and Drs. Duncan, Kelly, Spurgin, and Adam Wilson.

PROCEEDINGS OF THE NORTH-WESTERN BRANCH OF THE INCORPORATED SOCIETY OF MEDICAL OFFICERS OF HEALTH.

THE ordinary meeting of this branch was held at the rooms of the Chemical Club, Manchester, on Friday, January 12th, at four p.m. Present: Drs. Paget (president), Anderson, Armitage, Bower, Etches, Gornall, Kenyon, Pilkington, Porter, Sergeant, Stephenson, Tattersall, and Vacher. There were present as visitors Dr. Park, Messrs. J. T. F. Bishop and Wm. Naylor.

The minutes of the last meeting were read and confirmed.

A letter was read from Dr. R. Musgrave Craven (medical officer of health for the Westmoreland Combined Sanitary Districts), in which he drew attention to some inquiry forms which he had supplied to his inspectors and required them to fill in when reporting on notified cases of infectious disease. The object was to compel the inspector to make a thorough examination of the premises visited, and to further information as to the source of infection.

Copies of the forms were passed round and commented upon.

Dr. GORNALL showed a photograph of some defective drain connections at the back of a house in which typhoid fever had occurred.

Dr. KENYON referred to an instance, in a house at Bromboro', of a soil-pipe being cut off immediately after being carried through the external wall and distributing in a pipe-head. The object apparently was to save the price of an ordinary soil-pipe ventilator.

Dr. ANDERSON said that this method of dealing with a soil-pipe was many years ago recommended in Blackpool. The arrangement was not satisfactory, and resulted in a nuisance sooner or later. The opinion of those present was that the arrangement was bad, and should not be allowed.

The following nomination was read: John Robert Summers Park, L.R.C.P. and L.R.C.S. Edin., L.F.P.S.Glas., Medical Officer of Health for Darkinfield; proposed by the president and seconded by the hon. secretary.

The nomination was accepted subject to its being approved of by the Incorporated Society of Medical Officers of Health.

The PRESIDENT then called upon Mr. Naylor to read his paper on:—

THE GROWTH OF OPINION ON THE SELF-PURIFICATION OF RIVERS.

(This will be printed in the March number of PUBLIC HEALTH.)

(End of Proceedings of the Incorporated Society of Medical Officers of Health.)

Public Health.

IN another column are reported the particulars of two instances of serious friction and difficulty in connection with the working of the Infectious Disease (Notification) Act.

In the first case a rural health officer, who is also engaged in general practice, had notified to him a case of scarlet fever. The parents being dissatisfied with the doctor in attendance dismissed him, and the medical officer of health was asked and consented to attend the patient in question. The subsequent course of the disease led him and a third practitioner, who subsequently saw the patient, to the conclusion that she was suffering from typhoid and not scarlet fever.

In attending this patient after the parents had dismissed the first doctor, the medical officer in question acted strictly within his rights. If, as is possible in a rural district, there was no third practitioner within easy reach, he may have had no alternative but to attend. The wisdom (from an official standpoint) of thus attending may however be doubted; in any case, it is not surprising that the first practitioner should have considered he had a grievance, and proceeded to complain accordingly.

Subsequent events, however, placed the rural health officer, in our opinion, entirely in the wrong. Sixteen cases of scarlet fever were notified by the "aggrieved" practitioner. The medical officer of health, according to his own report, visited these cases, "and in only one did he find traces of scarlet fever having existed." In examining these cases independently of the notifying practitioner he was disregarding a very valuable rule of professional etiquette, and one which on public grounds should be generally observed.

The metropolitan case, which we also report, is an equally unfortunate one. A case of erysipelas was notified, whereupon the medical officer of health "called on the patient in question and decided that there were no symptoms of erysipelas in the case." Subsequently payment of the fee of 2s. 6d. was refused. Taking the facts as they are reported, there was not the slightest justification for this refusal to pay the fee for notification; nor was there any justification for the action of the medical officer of health in independently examining the patient, unless there was evidence of *mala fides* on the part of the certifying practitioner, which does not appear in the printed reports.

We draw attention to these two unhappy cases because we are strongly of opinion that the multiplication of such occurrences will seriously prejudice the minds of medical practitioners and of the general public against the notification of infectious diseases, and thus diminish the efficiency

of this most potent means of preventing their spread. It is not the duty of the medical officer of health to verify (still less to contradict) diagnoses. When parsimonious local authorities urge (as they sometimes do) their medical officers of health to examine each case of infectious disease, it is their duty to persistently decline.

APPOINTMENT OF A MEDICAL OFFICER OF HEALTH NULLIFIED AT SHOREDITCH.—It is with satisfaction that we record the fact that the Local Government Board have declined to sanction the appointment of a medical officer of health for Shoreditch at a salary under £500 per annum. As the Shoreditch Vestry had already appointed a medical officer of health to devote the whole of his time to their service at £400 a year, this implies that a new election will be necessary. The Local Government Board is to be congratulated on its firmness in declining to yield to severe local pressure. The result would have been even more satisfactory had the central Board insisted on a minimum salary of £600 instead of £500; and we have reason to believe that the naming of the latter sum was owing to a mistake. We have hope therefore that consent will not be given to the appointment of "whole time" medical officers of health in future at a remuneration below the too moderate sum of £600 per annum.

ENTERIC FEVER IN THE TEES VALLEY.*

DR. BARRY'S report on Enteric Fever in the Tees Valley is a piece of work of almost national importance. The connection between polluted water supply from a river, and the spread of enteric fever over a wide district supplied by that water, has not in this country been previously so nearly demonstrated as in this investigation. If the statistical evidence on which Dr. Barry's important and far-reaching conclusions are based is to be considered inconclusive, it is doubtful if statistical evidence can in any such case be considered to be convincing.

We, therefore, propose to examine this evidence in some detail. In doing so, we shall assume that the main facts of the Tees Valley outbreaks and their association with the occurrence of floods are familiar; and shall adopt the plan of examining Dr. Barry's report from the standpoint of the objections stated *seriatim* by Mr. Wilson, the manager of the Stockton and Middlesbrough Waterworks, in the evidence which he gave before the Royal Commission on the Metropolitan Water Supply. In doing so, we perhaps owe an apology to Dr. Barry for setting the evidence of a layman interested in the reputation of the company he serves against that of a distinguished hygienist, an expert in statistical inquiries, who has no other interests to serve but those of scientific truth. It is only fair to add that Mr. Wilson marshals his figures with considerable skill, and that there is not the slightest reason to doubt their *bona fides*.

(*a*) Mr. Wilson's first objection to Dr. Barry's conclusion is that—

> The epidemic in September was not confined to the Tees water districts, but that it extended to other districts not so supplied.

He confirms this by stating that in the Tees water districts compulsory notification was in force; while in the other districts Dr. Barry's information was defective, being based on voluntary notification and personal application to medical practitioners. This objection appears to us to be completely met by a foot-note in Dr. Thorne Thorne's introduction to Dr. Barry's report (page 7). In this foot-note, districts—in all of which compulsory notification was in force—which differ in having or not having the Tees water supply are compared. The results are as follows:—

DISTRICTS IN WHICH COMPULSORY NOTIFICATION WAS IN FORCE.

	Population.		Attack-rate per 10,000 living from Enteric Fever in Districts.	
	Supplied by Tees Water.	Not Supplied by Tees Water.	Supplied by Tees Water.	Not Supplied by Tees Water.
Rural Districts...	8,991 ...	14 442 ...	89·0 ...	6·2
Urban Districts..	56,446 ...	2,643 ... (about)	51·1 ...	22·7 (founded on 6 attacks)

This table goes far towards completely upsetting Mr. Wilson's contention, at any rate so far as rural districts are concerned.

(*b*) Mr. Wilson next proceeds to discuss the statement (the substance of which is attributed by him to Dr. Barry) that—

> Enteric fever was epidemic in every part of the Tees water supply district, and was simultaneous in its outbreak in each part.

He avers that California, a village in the Tees district of supply with 162 houses, escaped in both the first and second outbreak without an attack. At Stockton it was "practically absent" in the old part (900 houses) during the first outbreak, and there were very few cases in the second outbreak. In other places supplied by Tees water it did not occur until 56 to 66 days after the great flood. It is unfortunate that Mr. Wilson does not state the total population of the areas supplied by Tees water, which, according to him, escaped the exceptional incidence of enteric fever after the two floods. So far as we can judge from the data given the number is small, and unless the results given were confirmed on accurate local inquiry we should be inclined to doubt them.

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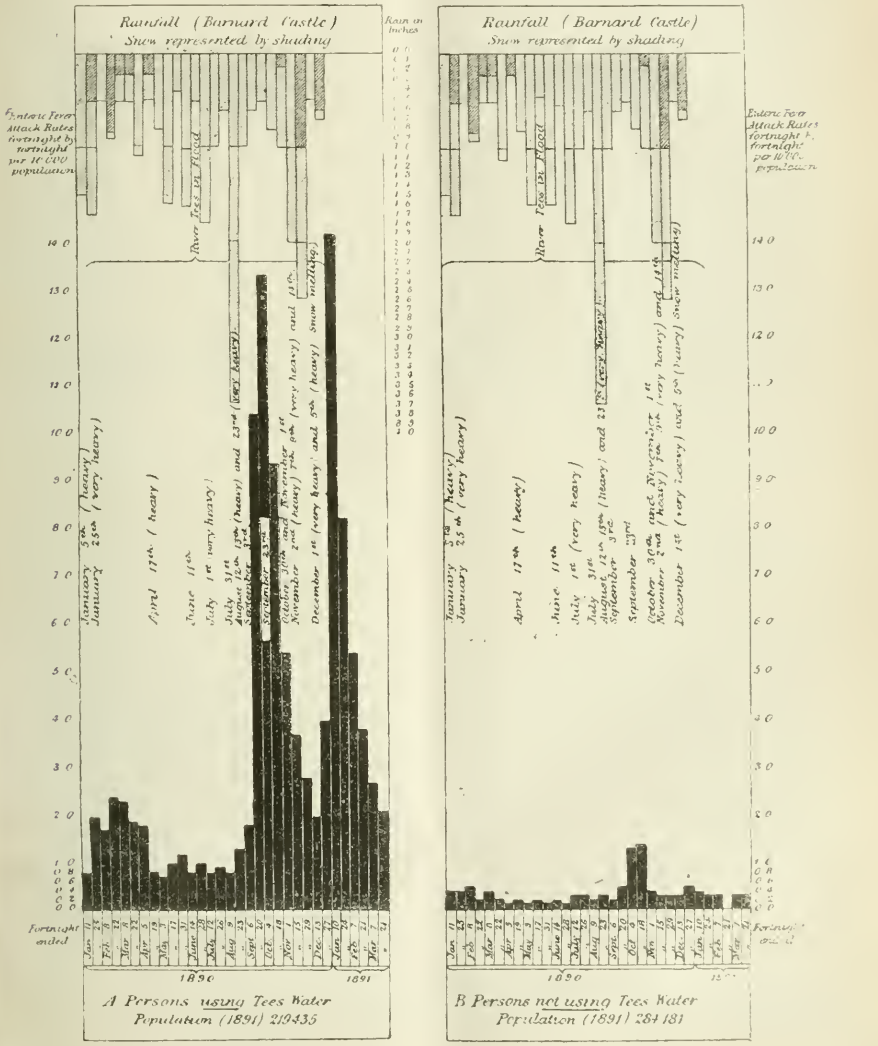
* Supplement to the Report of the Medical Officer to the Local Government Board for 1891, by Dr. Barry; and Minutes of Evidence, by Mr. D. D. Wilson, taken before the Royal Commission on Metropolitan Water Supply (p. 510, *et seq.*); and Appendices to the same (p. 495 *et seq.*)

DIAGRAM IX.

Shewing A for Persons using Tees Water and B for Persons not using Tees Water within area of the Tees Inquiry the Attack Rate per 10 000 living in each class, from Enteric Fever fortnight by fortnight from January 1890 to March 1891 (at the top of the Diagram is depicted the Rainfall recorded fortnightly in 1890 at Barnard Castle and elsewhere in the Diagram note is made of Tees conditions as recorded at Blackwell.)


Rainfall (Barnard Castle)
Snow represented by shading
Rain in Inches
Enteric Fever Attack Rates fortnight by fortnight per 10 000 population
River Tees 1st Flood
January 5th (Heavy) and 25th (very heavy)
April 17th (Heavy)
June 11th
July 1st very heavy
July 31st and 13th (Heavy) and 23rd (very heavy)
September 4th
September 23rd
October 3rd and November 1st
November 2nd (Heavy) and 9th (very heavy) and 11th
December 1st (very heavy) and 5th (Heavy) snow melting
Fortnight ended
1890
1891
A Persons using Tees Water
Population (1891) 219435
Rainfall (Barnard Castle)
Snow represented by shading
Enteric Fever Attack Rates fortnight by fortnight per 10 000 population
River Tees 1st Flood
January 5th (Heavy)
January 25th (very heavy)
April 17th (Heavy)
June 11th
July 1st (very heavy)
July 31st and 13th (Heavy) and 23rd (very heavy)
September 3rd
September 23rd
October 3rd and November 1st
November 2nd (Heavy) and 9th (very heavy) and 11th
December 1st (very heavy) and 5th (Heavy) snow melting
Fortnight ended
1890
B Persons not using Tees Water
Population (1891) 284181

The allegation that Dr. Barry's theory involves a simultaneous outbreak throughout the whole of the Tees district is made by Mr. Wilson, who states that in the first outbreak "the epidemic had first clearly shown itself" in different localities at dates varying between the extremes of August 26th and September 26th; in the second outbreak between December 1st and 25th. The results of a flood would, however, probably continue for a considerable time after its occurrence; and there is a vagueness about the phrase as to the time at which the epidemic first clearly showed itself that leaves much scope for more accurate information. Could Mr. Wilson supply us with the number of cases of enteric fever notified (in compulsory notification districts) for each week during the two months from the dates of the first and the second flood respectively, and will he be content to abide by the result? Failing this, we fall back on the attack-rates given for fortnights, during the periods mentioned, in Table VIII., p. 11, of Dr. Barry's report, and the summary of these given in Table IX., p. 12 of the same report. It is in the highest degree improbable that relative incompleteness of notification will account for the remarkably smaller attack-rate in the twenty-two sanitary districts not supplied by Tees water, when compared with the ten sanitary districts supplied from the Tees.

In the following table these results are summarised:—

ATTACKS PER 10,000 POPULATION.

	First Six Weeks' Period, Sept. 7th to Oct. 18th, 1890.		Second Six Weeks' Period, Dec. 28th, 1890, to Feb. 7th, 1891.
Ten sanitary districts supplied by Tees water ...	31	.....	26
Twenty-two sanitary districts not supplied by Tees water	3	.....	1

It is a striking confirmation of the accuracy of Dr. Barry's conclusion that the greatest excess of attack rate from enteric fever was during January, 1891, at a period when enteric fever is, as a rule, but little prevalent. We fall back upon Dr. Barry's statement, which is practically untouched by Mr. Wilson's contention. "The whole thing . . . occurred in a burst. In a certain fortnight they had an enormous increase of the typhoid cases, and there must have been for that a common cause."

(*c*) Mr. Wilson next criticises the statement attributed by him to Dr. Barry that—

The maps demonstrate the *uniform* distribution of the house invasions throughout the districts in question.

Under this head he points out some irregularities of distribution, which do not, however, appear to impugn the general result. It is evident that in an outbreak due to infected water there would be, after the first week, secondary infection due to personal contact by nursing, and to favourable local insanitary conditions. These would inevitably cause local irregularities of distribution of the disease. They do not, however, account, on the whole, for the enormous difference at two special periods between districts supplied and not supplied by Tees water.

(*d*) The next point criticised is the statement that—

The sanitary arrangements in the several districts supplied "differed *inter se* in all variety of ways," and only was there "community of circumstances" as regards water supply.

Mr. Wilson points out that in previous reports by medical inspectors of the Local Government Board, outbreaks of enteric fever, etc., in this district have been attributed to ashpits and foul drains, and evidently thinks it hard that this etiological view was not maintained on the present occasion. It is, however, for him to show that in any previous outbreak in districts not supplied by the Tees water, enteric fever has shown so great an excess of incidence or mortality as was manifested in the present outbreaks in the districts supplied by Tees water.

(*e*) The next statement traversed is that—

The time when the second outbreak was at its worst was at a time of the year when enteric fever is, unless very special conditions favour its dissemination, unapt to become epidemic in this country.

It is attempted to be shown under this head that previous outbreaks of enteric fever had been traced to the filthy conditions which are admittedly rife in this district, and that Dr. Barry had originally favoured this view in the present outbreaks. Assuming these contentions to be established, a provisional conclusion is obviously not binding; and the onus remains with Mr. Wilson to prove that the remarkable excess of incidence of enteric fever at two particular periods following floods in the districts supplied with water from the Tees, was caused by insanitary conditions special to these districts.

(*f*) The partial destruction in 1885 of a weir known as the "Warrers" at Barnard Castle, and its almost total destruction since, have changed the condition of the river so, that while previously there was no foreshore at Barnard Castle to admit of the accumulation of filth and excremental matter, there is now a wide foreshore, on which large quantities collect, to be washed down on the occasion of heavy floods in the river, that such floods took place on August 12th and 23rd and December 1st, and that the origin of the epidemic was to be found in the excremental matter washed into the river at these dates.

Mr. Wilson, in traversing this statement, thinks that Dr. Barry is misinformed, and that there is no practical alteration in the condition of the foreshore since 1884. Be this as it may, it appears certain that matters have been so arranged at Barnard Castle as to ensure the fouling of the river with every conceivable kind of filth. That such filth could remain for any length of time free from the specific infection of enteric fever could hardly be expected. The photographs given in Dr. Barry's report give a vivid idea of the amount

and variety of this pollution. The intakes of the two supplies of water from the Tees are at a point two miles west of Darlington. Even in times of greatest drought from 27 to 45 million gallons of water flow past this point per day. Barnard Castle (population 4,341) is seventeen miles higher up the river than the waterworks, while much smaller villages drain into the Tees at lower points, the nearest to the intake being a village of about thirty houses half a mile above it.

Having summarised the objections to Dr. Barry's report raised by Mr. Wilson, we are in a position to examine the theory of the latter as to the origin of the two outbreaks of enteric fever following on the floods of August and December, 1890. In attempting to show that the water supply was not responsible for the outbreak, he states that he has been met by the following question :—

If it is not the water, how do you account for the presence of the fever in Coatham and its absence from Redcar? There is only a street to divide the two places, but they have different water supplies.

The outbreak in Coatham is ascribed by Mr. Wilson to chokage of the drains in this district, which had previously been contaminated by specific infective material, and to the unloading of infected manure in this district. Probably Dr. Barry would be quite willing to admit the influence of these factors in fostering the outbreak, though it must be admitted that the picture Mr. Wilson draws is incomplete, until he also proves the absence of the same factors in the Redcar district.

Mr. Wilson proceeds to examine the death returns from enteric fever in the large towns named in Dr. Barry's report. And here he makes what is in our opinion his first and only "point." He shows that in addition to the excess of deaths from enteric fever following the two floods in Tees supplied towns, there was between the two outbreaks of September and January an intermediate excess of mortality culminating in November; "which mortality is not provided for by Dr. Barry's theory," there having been apparently no corresponding flood, unless we condescend to reckon "a trifling flood in the river on September 23rd!"

We may quote here the exact enteric fever death-rates given by Dr. Barry :—

DEATHS PER 10,000 POPULATION FROM ENTERIC FEVER.

	3½ months to Dec. 13th, 1890.	3½ months to Mar. 21st, 1891.
Ten sanitary districts supplied from the Tees	5·0	4·5
Twenty-two sanitary districts not supplied from the Tees	1·5	0·5

The above objection raised by Mr. Wilson is probably explained by the fact that water-infection and infection from specifically contaminated soil and drains were acting at the same time. All the objections raised by him completely fail in explaining, on any other supposition than that of water-infection, the immense preponderance of enteric fever in the Tees-supplied districts.

We next look with much interest to Dr. Barry's description of the processes of filtration adopted at the waterworks. Apparently the methods employed are not open to criticism. Dr. Barry contents himself with a bare statement of the methods employed.

Apparently no evidence was obtainable as to any temporary disorder of the filtering arrangements during the two floods which were responsible for the outbreaks of enteric fever. Had this hiatus in the evidence been capable of being filled up, Dr. Barry's demonstration of the relationship between the polluted water and the outbreaks of enteric fever would have been as complete as that of the relationship between polluted water and cholera in the Hamburg-Altona outbreak.* As the matter now stands, we are compelled to assume either that the filtration of the Tees water was imperfect, or that sand filtration when carefully carried out is an insufficient protection against the transmission of enteric fever germs into drinking water. The latter conclusion implicitly carries with it a condemnation of the water supply of the greater part of the metropolis, a condemnation which what may be called the clinical history of London since the present filtering arrangements were adopted, does not confirm.

TRICHINOSIS.—In February, 1892, after an interval of 20 years, four fatal cases of trichinosis occurred in Massachusetts. The clinical history of seven cases out of the total epidemic of over 50 cases is given in full in the twenty-fourth annual report of the State Board of Health of Massachusetts. It is significant that it was not until the second death and three or four weeks from the commencement of the epidemic that a correct diagnosis was made. The attacks were mistaken for rheumatism, typhoid, and "grip." Apart from the symptoms of gastro-enteritis, the most characteristic symptoms appear to have been œdema of the face and eyelids and stiffness of the legs. The patients were all foreigners, chiefly Austrians and Germans, who were employed in connection with a cotton mill. From inquiries which were made it appeared most probable that the trichinæ ingested were contained in Bologna sausage. An official laboratory has been established at Chicago for the examination of pork intended for *export*, and this appears to have rendered the American public more prone to have trichinous pork foisted upon them than formerly. A. Seibert, of New York, states that from 5 to 16 per cent. of American hogs contain trichinæ, while in Germany only 1 out of 2,000 contains them.

* See "Water Filtration and Cholera," by Prof. R. Koch. (Separat-Abdruck aus der Zeitschrift für Hygiene und Infectious Krankheiten, Vierzehnter Band, 1893.) Translated from the German by A. J. A. Ball, Esq., B.A., of the Local Government Board.

AN EPIDEMIC OF ENTERIC FEVER IN MASSACHUSETTS DUE TO INFECTED WATER SUPPLY FROM THE RIVER MERRIMAC.

Lowell and Lawrence are the largest cities on Merrimac River, Lawrence being nine miles nearer the sea than Lowell. The village of North Chelmsford is three miles above Lowell. A serious epidemic of enteric fever was found to exist in Lowell in November, 1890, and this had been preceded a few weeks earlier by a severe outbreak of enteric fever in North Chelmsford, such as had not occurred there before for forty years. In a photograph in the Twenty-fourth Annual Report of the State Board of Health of Massachusetts, the position is shown of privies on the bank of the Stony Brook, a small and often very foul stream emptying into the Merrimac at a point about two and a half miles above the intake of the Lowell water-works, but on the opposite side of the river. These privies were used by patients suffering from enteric fever in its early stages between August and October. The Lowell epidemic began in September, became very marked in October, and increased very rapidly in the first half of November. The exact comparison given in the above report between the periods of known infection of Stony Brook and the incidence of cases of enteric fever in Lowell is interesting and significant. The positive phase of the Lowell wave extended from September 15th to December 1st, and covers eleven weeks. The positive phase of the infection wave of Stony Brook began on August 9th, and extended, with interruptions, to October 27th, covering a little over ten weeks. The last known infection of the Stony Brook was on October 27th, and was of a severe character; and the greatest amount of enteric fever in Lowell began about November 10th-17th. The continuance of a large amount of enteric fever for about a fortnight after this date is explained by the occurrence of secondary infection.

The facts that the epidemic in question was confined to Lowell and not spread over the whole of the Merrimac valley; that it was widely distributed over the city, and not limited to any particular district; that a special source of infection was discovered at North Chelmsford, occurring at a time fitting in with the incidence of the epidemic in Lowell; and that the epidemic ceased after this particular infection ceased, seem to compel the conclusion that this specific infection from a source two and a-half miles above the intake of the city supply of water was the cause of the epidemic.

Two objections are raised to this conclusion. (*a*) It is urged that if the fever had really come with the public drinking water, it would have appeared throughout its distribution in exact proportion to the density of population, which was not the case. Dr. W. T. Sedgwick, the writer of this important report, explains this by the well-known fact that "bacteria, as a rule, gradually diminish in numbers in the service pipes of a water supply," and he gives the results of bacterioscopic observations of Lowell City water taken at various points in the city in support of this view. In a general way the enteric fever was more abundant near the distributing reservoirs. The very brief stay of the water in the reservoir before being supplied to the city was another reason increasing the danger to Lowell, and accounting for the comparative immunity of Lawrence, in which there were more efficient storage arrangements.

(*b*) It is urged that the dejecta of a few enteric patients at North Chelmsford could not contain sufficient germs to lay low several hundred patients in Lowell, the Merrimac, furthermore, being a large, swift river, and only a small fraction of the infective material being drawn by the pumps and supplied to the citizens of Lowell. In answer to this, it is stated that only about 1,000 persons in Lowell out of 78,000 suffered during the epidemic (and the latter part of these were probably due to secondary infection); while in the well-known Caterham outbreak a few discharges from one person were apparently sufficient to produce an epidemic of 351 cases, with 21 deaths from enteric fever, in a population of less than one-fifth that of Lowell.

In Lawrence, nine miles lower down the river Merrimac, a similar epidemic occurred, the details of which are given in the twenty-second annual report of the State Board of Health of Massachusetts. In the Lawrence outbreak there was a still more obvious prevalence of cases than at Lowell in those parts of the city which received water most quickly from the reservoir. It was urged that if a few cases of enteric fever at Stony Brook had caused hundreds in Lowell, these same hundreds in Lowell must necessarily have caused thousands in Lawrence, while, in fact, not quite so many were affected as in Lowell. Both cities are supplied from the Merrimac, from which water is pumped into distributing reservoirs, and then distributed by gravity. Here, however, the similarity ceases. Lawrence had larger reservoir capacity than Lowell; at Lowell the water scarcely more than passed into and immediately out of the reservoir, while the water in the Lawrence reservoir remained nearly at rest for about a week. Finally, owing to the relatively concentrated form of the city of Lowell, its distribution of water to the majority of people was largely radial, and therefore prompt, while at Lawrence the journey of the water in the pipes was long.

Lowell and Lawrence are the only cities in the Merrimac valley in which typhoid fever is usually excessive, and they are, so far as is known, the only cities in this valley which draw their drinking water from a sewage-polluted river. Thus, the combined population of five other cities on the

Merrimac was 121,800, that of Lowell and Lawrence 122,350. The average enteric death-rate in the former group from April 1st, 1888, to March 31st, 1893, was 37·5 per 100,000; that of Lowell and Lawrence for the same period was 116·9 per 100,000. In the special epidemic year the enteric death-rate in Lowell was 195·4, and in Lawrence 187·0, as compared with rates varying from 5·3 to 57·6 per 100,000 in the five other cities.

For the complete account of this and other epidemics of enteric fever associated with a water supply from rivers, the original report from which the preceding summary has been made should be consulted.

THE PURIFICATION OF WATER BY FILTRATION THROUGH SAND.

THE experimental work at the Lawrence Experiment Station has considerable importance in its bearing on the question of river water supplies.* The continued investigations at the experimental station "confirm the belief that the typhoid bacillus is sometimes present in sewage-polluted waters, and indicate that it is able to live in such water for at least three weeks; and further investigations by the Board show that high death rates from typhoid fever appear to result from drinking such contaminated water." The experimental results show that "filters can be constructed and operated up to rates of 2,000,000 gallons per acre daily—rates which make their application to public water supplies quite economical—with the removal of substantially all of the disease-producing germs which may be present in the unfiltered water."

The experimental filters were so constructed and operated as to throw as much light as possible upon the laws of filtration; that is to say, the experiments were so arranged as to allow direct comparison of the power of bacterial purification of water under different rates of filtration, with sands of different degrees of coarseness, with different depths of the same sand, with the presence of loam layers, and with intermittent and continuous filtration.

Since one of the most important points in the filtration of water is the removal of disease-producing germs, the actual efficiency of these filters has been tested by the application of typhoid fever bacilli, and observations upon their passage through the filters. Repeated applications have also been made of more easily recognised species, such as B. coli communis and B. prodigiosus. It was found, particularly in the case of the latter species, that with these more results fully as reliable and under more nearly parallel conditions could be obtained than by working with typhoid fever germs. It was further determined by a series of experiments that the life histories of B. prodigiosus and B. typhi abdominalis in the water of the Merrimac River at Lawrence are quite similar: that is to say neither species multiplies, but both continue to live, although in greatly diminished numbers, for at least three weeks—sufficiently long for all requirements of these experiments.

During the earlier portions of the year very large numbers of B. typhi abdominalis and other species were respectively applied in single doses to the several filters at different times, and the effluents examined for several days. From long-continued experiments it has been learned that the species of bacteria above named can be so grown that when placed in the river water with their culture medium the numbers of bacteria of these species equal those of other species originally present in the water, while the food material added need not increase the organic matter beyond the limits of variation of the organic matter naturally present in the river water.

Beginning in September, B. prodigiosus was systematically applied each day to a large number of the filters, and the application continued throughout the remainder of the year. The general plan of the experiments was to apply this species of bacteria in small repeated doses for ten hours each day, and examine the effluents four times daily at the time when the water containing the applied doses had reached and was coming through the underdrains. It is believed that the results give a thoroughly reliable test of the degree of bacterial purification effected by the filters, and these are the data which have been largely used in deriving the laws of water filtration.

The numbers of bacteria in the applied river water and in the various effluents have been determined each day. It has been found, however, that the true degree of bacterial purification is somewhat obscured by the presence in the effluents of bacteria which have not come down through the filter directly from the applied water. Some of them appear to have their origin in the outlet pipes and underdrains, where they continue to live upon the very slight amount of food present. This is especially noticeable during the warm summer months, when a few of the most hardy species grow upon the organic matter stored at the surface. Inasmuch as B. typhi abdominalis and B. prodigiosus do not multiply in the applied water, but continue to live for several weeks in diminished numbers, the advantage of working with such species in determining the hygienic efficiency of filtration is apparent, particularly in the case of B. prodigiosus, which has never been found native in this country.

In regard to the degree of bacterial purification effected, it is to be kept in mind that many of the results were obtained under conditions much more severe than would occur in the actual filtration of a public water supply. Thus, in some cases, the number of germs applied was several hundred thousand per cubic centimeter; in some filters the sand was less suitable than would be recommended for any filter of a public water supply, such conditions being here introduced in order to determine the laws of filtration; and the results so obtained are less perfect than might otherwise have been secured. The following table shows the average percentages removed of single species of bacteria under favourable conditions, and by filters which can be constructed on a large scale.

TABLE SHOWING EFFICIENCY IN WATER PURIFICATION OF SUITABLE SAND FILTERS.

Number of Filter.	Date—1892.	Rate—Gallons per acre daily.	Kind of Bacteria.	Per Cent. Removed
36 A...	Ap. 11 and May 25	1,500 000	B. typhi abdom.	99·93
36 A ..	Nov. 1—Dec. 10	3,000,000	B. prodigiosus	99·95
33 A...	Sept. 16—Oct. 7	2,000,000	B. prodigiosus	99·90
34 A...	Sept. 16—Oct. 7	2 000,000	B. prodigiosus	99·98
37.....	Oct. 7—27	2,000,000	B. prodigiosus	99·89

The results of the experiments, which show that in all of these filters adapted to the purification of drinking water more than ninety-nine and one-half per cent. of the applied bacteria were removed, together with the actual experience of many European cities having remarkably low death rates from diseases known to be capable of conveyance by drinking water, while using filtered water drawn from polluted sources, leave no room for doubt as to the efficiency of such filtration, when properly conducted, as a safeguard against water-carried diseases.

* Twenty-fourth Annual Report of the State Board of Health of Massachusetts.

Considerable light is thrown on the laws of water filtration by the results obtained at the Lawrence Station. More bacteria are able to pass the filters at high rates than at low rates; but varying rates (from 500,000 to 3,000,000 gallons per acre per day) only cause a variation in the experiments of the fractional part of 1 per cent. of the bacteria applied. Increasing the depth of the filtering material beyond two feet appeared to exert but little influence upon the removal of bacteria, except with the higher rates of filtration.

The effect of removing the clogged surface sand is a point of great importance in view of Koch's experimental results. These are confirmed by the Lawrence results, which showed an increase in the number of bacteria in the filtered water for three days after scraping. But even at this time of least purification there is still an average removal of more than 99·4 per cent. of the bacteria found in the applied water.

THE BLACK DEATH.*

A COMPLETE account of the Great Pestilence (A.D. 1348-9), now commonly known as the Black Death, has been long a desideratum. That want is now met, and the exhaustive history by Dr. Gasquet before us is an important addition to medical epidemiology. Two processes are involved in the production of a history like this; the searching for and collation of material, and the weaving into a connected narrative of the material thus collected. In the former process the materials available in the British Museum and elsewhere have been utilized to an extent never before attempted; while in the latter process Dr. Gasquet has produced a narrative which is readable from the first page to the last.

It is surprising, as the author remarks, that the story of the Great Pestilence, which appears to have carried off one half of the population, and which, in its far-reaching results, was one of the most important events in the history of our country, should never have been fully told. Coming, as it did, between Crecy and Poitiers, at a time when, judging by the ordinary manuals of history, England was at a point of greatest glory, even historians have failed to realize the enormous social and religious effects which are directly traceable to the pestilence.

The author points out that for a time, on the announcement of Dr. Creighton's "Epidemics in Britain," he put aside his work; but finding, on the appearance of this work, that it "had not entered into his design to utilize the great bulk of material to be found in the various records of the period," and that he had treated the subject from a wholly different point of view, he subsequently decided to publish the large mass of contemporary material which he had extracted. This Dr. Gasquet does, not treating of the pestilence as an item in the general series of epidemics, but considering it in detail (as it has never been previously considered) from the mere point of view of the historian. The Great Pestilence was a turning point in the national life, "forming the real close of the mediæval period, and the beginning of our modern age." A scarcity of labourers followed the sudden sweeping away of the population, and "to use a modern expression, labour began then to understand its value, and assert its power." Dr. Gasquet further contends that in 1351 the whole ecclesiastical system was more than half ruined, and that everything had to be built up anew. Even the most inadequately-prepared ministers of the rites of religion were to be obtained only in insufficient numbers. "Instead of turning men to God, the scourge turned them to despair, and this not only in England, but in all parts of Europe." The fifteenth century witnessed the beginnings of a great middle-class movement, which is traced by the author to the effect of the Great Pestilence.

The Great Pestilence first reached Europe in the autumn of 1347, having apparently originated in the East some three or four years previously, and been spread by the great trade routes of the East. It would appear to have been some form of the ordinary Eastern or bubonic plague. It usually showed itself in swellings and carbuncles in the axilla and groin. These were in the plague of 1348-9 generally accompanied by gangrenous inflammation of the throat and lungs, with vomiting and spitting of blood, and the foul odour which might be expected in gangrene of the lungs.

Dr. Gasquet traces the progress of the pestilence from Constantinople by Italian trading ships, which everywhere spread the terrible contagion. The records agree as to the terror which the visitation inspired, the people fearing to fly and yet not daring to remain. The infectivity of the clothes of the dead is strikingly instanced in the case of four soldiers at a place near Genoa. Returning to their camp "they brought with them a woollen bed-covering they had found at Rivarolo on the sea coast, where the sickness had swept away the entire population. The night following the four slept under the coverlet, and in the morning all were found to be dead." At Venice, out of 24 doctors 20 were soon carried off by the sickness; and of the total population it is said that more than 70 out of every hundred died. The particulars of the outbreak at Florence are given in Boccaccio's graphical words. The awful suddenness of the death often inflicted by the scourge is noted by nearly all writers of the period.

After devastating Italy and leaving it to the subsequent ravages of famine, the disease rapidly spread in France. It reached Avignon, where Pope Clement VI. held his Court, as early as January

* "The Great Pestilence" (A.D. 1348-9) now commonly known as the Black Death. By Francis Aidan Gasquet, D.D., O.S.B. (Simpkin, Marshall, and Co., 1893).

1348, and in the first three days 1,800 people are reported to have died. Gui de Chauliac, the Pope's medical attendant, caught the disease, but was one of the few who survived. He has left an account of the disease, in which he confesses (before his own attack), "As for me, to avoid infamy, I did not dare to absent myself; but still I was in continual fear." In acting thus he was braver than most of his contemporaries, for the sick were often deserted by their relatives, and, it being assumed that persons attacked would surely die, many were thrown alive into the pits prepared for burial on a large scale.

While the plague was at its height, King Philip VI. instructed the medical faculty in Paris to report upon it. Nothing could more forcibly illustrate the greater humanity of modern times than the advice given by the doctors to "those who are always near those who are sick. We advise them to depart, for it is in this way that a great number have been infected by the plague." But perhaps this was only intended to apply to those who were unnecessarily within an infectious distance of the sick. In September, 1349, at Amiens, we learn of what is perhaps the first instance on record of a combination of workmen to secure a rise of wages. These workmen, who were employed at a tannery, are said to have combined to secure for themselves excessive wages "to the great hurt of the people at large;" a combination which was met in a manner that would not now be tolerated, the Mayor proclaiming and establishing a fixed rate of wages. At Tournay the deaths are stated to have been more numerous about the market-places and in poor, narrow streets than in broader and more spacious areas. When a case occurred in a house the rest of the household were always attacked. In many cases dogs and even cats died, apparently from the same disease.

Without attempting any summary of Dr. Gasquet's description of the course of the pestilence through other European countries, we pass to the much more detailed description of its ravages in England. It reached this country in the autumn of 1348, Calais, then in the possession of the English, being the connecting link. The chroniclers record that from June 24th to Christmas of that year it rained either by night or day with hardly an exception. This possibly favoured the spread of contagion. Starting from Weymouth — then a more important port than Bristol—the disease rapidly spread. In attempting to estimate the proportion of the population carried off by the pestilence, the author lays stress on the high importance of the ecclesiastical registers. He adds, "possibly the mortality may have been greater among ecclesiastics than among lay persons; but only from the number of the clergy carried off by the epidemic can an estimate be formed as to the number of lay people who died." In the diocese of Bath fully half the number of beneficed clergy fell victims to the disease. Many livings were rendered vacant two and three times during its course; while a not inconsiderable number had four changes of incumbents within these few months. In Bristol, as probably in most places, the cemeteries did not long suffice for the multitude of the dead. Dr. Gasquet gives one instance of this from the Patent Rolls. The parson of Holy Cross de la Temple obtained half an acre adjoining the old cemetery, and so pressing was the need for this fresh accommodation that it was done without the required Royal license, for which subsequently a pardon had to be sued from the King.

It is of interest to note how greatly the coast towns generally appeared to have suffered, the contagion being probably carried from one place to another by fishing boats. A similar explanation may partially explain the passage (like cholera) along the track of rivers.

Rapidly the disease spread in every direction from the western counties. Gloucestershire strove for a time, but in vain, to protect their city by prohibiting any intercourse with plague-stricken Bristol. An English contemporary writes that "the living scarcely sufficed to tend the sick and bury the dead." Parliament, which was to have assembled at Westminster in January, 1349, was prorogued on account of the pestilence, and in March it was again prorogued, the pestilence being worse than ever. William Dene, a monk of Rochester, wrote, "Alas, for our sorrow! This mortality swept away so vast a multitude of both sexes that none could be found to carry the corpses to the grave. Men and women bore their offspring on their shoulders to the church and cast them into a common pit. From these there proceeded so great a stench that hardly anyone dared to cross the cemeteries."

In Leicestershire a local record states that during the epidemic there was a great mortality of sheep, in one pasture more than 5,000 sheep dying. Every kind of food at this time was extremely cheap; but in the following year "no one could get a harvester at a lower price than 8d., with food. For this reason many crops perished in the fields for lack of those to gather them." The plague reached York in February, 1349, and an examination of the ecclesiastical records shows that one-half of the clergy at least were carried off by it. In Northumberland the case of the people was so desperate that in 1353 more than £600, which was owing to the King for taxes for 25 parishes named, was allowed to stand over, since it was hopeless to press for payment. Of Newcastle and Carlisle the same story is told.

In Somersetshire, in 1349, the total number of clergy instituted to vacant livings in the diocese was 232, against an average in a normal year of 35. Dr. Gasquet appears to think that the people generally suffered as greatly as the clergy in proportion to total numbers. Is it not, however, likely

that priests, in performing their duties (to which in England, unlike many continental countries, they appear to have bravely kept) of administration of the Sacrament, Absolution, and burial, were more exposed to infection than the average lay person? But, allowing liberal deduction for this view, the picture of the desolation of the country drawn by the author in Chap. IX. is intensely and painfully interesting.

In the last chapter the author treats of "Some Consequences of the Great Mortality." Those who have examined the records themselves are practically unanimous in considering that the disease swept away fully one-half of the entire population of England and Wales. The most immediate effect of this mortality was to produce a complete social revolution. The Black Death comparatively speaking spared the rich and took the poor. Thus a premium was put upon the services of those that survived, and consequently the old methods of cultivation and the old tenures of land became impossible. The land owners, who hitherto had had it all their own way, now had a hard time of it. In vain did the King and Council attempt to prevent the rise of wages by legislation. The frequent complaints of non-compliance with the regulated wages were eloquent proofs of the futility of the legislation. Gradually also the traditional system of cultivation of the land by the land owners and their bailiffs gave way to the land lease with a certain fixity of tenure. The popular rising of 1381 practically emancipated the labourers from the mediæval system of serfdom.

The Great Pestilence left its traces on our language, English superseding French among the nobility and gentry, who had always previously spoken the latter. Traces of the pestilence are visible in the architecture of many churches, which having been partially built before it commenced, were not completed until after a change had been made in the style in vogue. Upon the Church itself, Dr. Gasquet points out that the sudden removal of so large a proportion of the clerical body must have caused "a breach in the continuity of the best traditions of ecclesiastical usage and teaching." The dearth of priests is indicated by several striking examples. In the diocese of Bath and Wells a man was admitted to the first step to orders in the lifetime of his wife, she giving her consent and promising to keep chaste, but not, as was usually required under such circumstances, being compelled to enter the cloister, "because she was aged, and could without suspicion remain in the world." Similarly another priest at his ordination was made to swear upon the Holy Gospels that within twelve months he would learn the Articles of Faith, the Ten Commandments, the seven mortal sins, the form of baptizing, etc. The demand for higher stipends was taken up by the survivors among the clergy, as well as among labourers. King Edward, referring to this fact, inveighed against "the unbridled cupidity of the human race," forgetting that owing to the paucity of labourers, the cost of subsistence had increased for priests as for the rest of the community.

The foregoing sketch of the scope of Dr. Gasquet's work will probably tempt many hygienists to purchase it. Its interest is very great, whether from the hygienic or the historical standpoint. The value of the book is enhanced by a copious index.

DIARRHŒA IN SOME LANCASHIRE AND YORKSHIRE TOWNS IN 1892.*

With a Note on an Experiment in Scavenging.

By J. Spottiswoode Cameron, M.D., B.Sc., Edin., M.O.H. for Leeds.

The death-rate from diarrhœa in the 28 large towns in the decade 1882-91 was 0·88, while for the year 1892 it was 0·71, an improvement of 19·3 per cent. In Leeds, while our death-rate had been 1·12 in the ten years, it was 1·09 in 1892, an improvement of less that 3 per cent. There was, therefore, in that year, somewhat of a check to the improvement which had been taking place in our diarrhœa death-rate during the two preceding ones. In a special report on this subject to the Sanitary Committee at the close of the autumn of 1892 I showed by a chart how the larger Lancashire and Yorkshire towns had severally behaved during the quarter. In Salford a sudden rise in the death-rate to 8½ per thousand occurred in the week ended September 3rd, the average rate for the three months being 2·57. In Liverpool and Manchester the rates were respectively for the quarter 2·45 and 2·08; the highest rate for the former being 4 deaths per thousand of the population during the week ended August 13th, the curve for the quarter having a second but more gradual rise during the end of August and the beginning of September. In Manchester the curve began to rise somewhat steadily a week later than the Liverpool apex, and reached 4½ and nearly 5 deaths per thousand in the fourth and fifth weeks of August. In Bolton, with a death-rate for the quarter of 3·72, while a rate of 4 per thousand was reached the same week as in Liverpool, a slight fall the following week was succeeded by a steady rise in the two weeks which followed. The death-rate for the week ended September 3rd was 11·7, after which the rate fell steadily in two weeks to 4 per thousand. It was nearly five in the penultimate and 0·4 in the last week of the quarter. In Preston, with a death-rate for the period of 4·49, the mortality rose in the week ended August 27th, from 1·9 to 5·7, and in the following week to 12 per thousand, dropping in the week ended September 10th to 11, and in the following week to 7, and two weeks later from 7 to 4. During the same period the death-rate in Oldham remained considerably below 1 per thousand to the end of August. In the

* Chiefly from Dr. Cameron's Annual Report for 1892.

week ended September 3rd, it rose to 2·7, the highest point reached during the quarter, whence it went steadily down, the average for the three months being 0·87.

Of the three Western Yorkshire towns, Sheffield, Huddersfield, and Halifax, in the first of these the rate for the period was 3 50, the mortality having increased in the first half of the quarter pretty steadily to nearly 3 per thousand, after which it shot up in the weeks ended August 27th and September 3rd, to 6·5 and 8·2. It continued for a week longer above 8, fell in the week ended September 17th to 5·5, and the two following weeks to 2·4 and 2·2. In Huddersfield the rate for the period was 0 57. The highest rates, 1 6, occurred in the weeks ended August 27th and September 3rd. Week ended September 10th the rate was 1·1, and the three following weeks 0·5. Halifax had an even lower rate of 0·14, only 3 deaths being recorded during the three months. Bradford had a rate for the thirteen weeks of 1·31; the rate kept well down till the week ended August 20th. In the week ended August 27th, the rate was nearly 1 per thousand, in the three following weeks it was 2·4, 2·6, and 3·3, falling in the week ended September 24th to 2·4, and in the last week of the quarter to 1·2. In Hull the rate altogether was 2·87; it kept low till the week ended August 20th; the next week it rose to 2·5 per thousand, the following week to 7. For the weeks ended September 10th and 17th, it was 6·4 and 6·6, the following week 5·4, and in the last week of the quarter 3·1. In Leeds our rate for the quarter was 3·39 After the end of July the rate rose pretty gradually to 5 per thousand, which point it reached in the week ended August 27th. The week ended September 3rd it stood at 9, fell to 8½ the following week, then to 6, 4, and 3 in the succeeding weeks. Of the towns mentioned, Leeds stood fourth in order of highest diarrhœa mortality for the quarter, the rates being: Preston, 4·49; Bolton, 3·73; Sheffield, 3·50; Leeds, 3·39. Hull, Salford, Liverpool, and Manchester ranged between 2·87 and 2 08, then came Bradford, 1·31; Oldham, 0·87; Huddersfield, 0·57; and Halifax, 0·14.* The three last-named are towns which have adopted the pail system of refuse removal pretty nearly in its entirety. The Registrar-General does not give the statistics for Rochdale, a town whose name is largely identified with this system.

Manchester, with a death-rate of 2·08 per thousand from this cause, compared with a general death-rate of nearly 24, compares favourably as to diarrhœa with Leeds with a death-rate in 1892 of 3·39 in the third quarter, and a rate from all causes for the year of under 20. In Manchester, again, a considerable portion of the town is dealt with on the pail system (there are about 23,000 middens and 75,000 pail closets). The high mortality in Bolton and Preston was probably accounted for to a large extent by work conditions. In both towns there was a high mortality amongst very young children, and in both towns I believe mothers work in the cotton factories. Preston is a town in which the midden system is still prevalent, although a great deal is being done in the introduction of water closets. The conversion, however, of middens into water closets has been delayed on account of the fear of increasing the sedimentary deposits in the river. The new sewage works have enabled the conversion to be proceeded with. The pail system has only been adopted to a very limited extent, and in a very imperfect manner in Leeds. About half its houses are provided with some sort of water carriage system, and about half have middens.

Postscript.—In consequence of the special report referred to, the Leeds Sanitary Authority determined to see whether any special means would reduce this high mortality from diarrhœa. It was accordingly resolved in one district, with a population of nearly 34,000, and comprising nearly a tenth of the town, to use certain special cleansing measures on the approach of summer (see Dr. Cameron's report for 1892, pp. 101-2). The result is noteworthy. In the dry autumn of 1893 Leeds, like other large towns, had a mortality from diarrhœa high even compared with that of 1892. That autumn the death-rate from this cause rose to 5·19, as compared with 3·42* the preceding year, and 3·28 the autumnal rate for the decade 1883-92. Only in one district in Leeds did the rate not exceed that of 1892, and that was the one specially scavenged. In another district the increase was merely nominal, but in the "scavenged" district the death-rate actually decreased as compared with that of 1892 from 7·01 to 6·40.

Those who have studied the Registrar-General's report for the autumn quarter of 1893 will have observed that the death-rate from diarrhœa did not increase in the same ratio in towns with a usually high rate from this cause as in those with a lower rate. Of the Lancashire and Yorkshire towns, for instance, Bradford, Oldham, Halifax, Blackburn, and Hull had rates respectively 105, 114, 150, 176, and 180 per cent above their rates for the preceding decade. Of these Hull had a rate for the decade of 3, Blackburn of 2·5, Bradford of 2·1, and Oldham of 1·4. On the other hand Leeds and Sheffield, with rates for the decade of 3·4 (R.G.), only increased their rate 50 per cent., and Preston, with a decade rate of 6 2, only 52 per cent. The increase in England and Wales was 75, that of the great towns only 40 per cent.

* The weekly rates were calculated from the deaths published in the Registrar-General's weekly returns, those for the quarter were taken from his quarterly return. The latter contains, sometimes, corrections of the weekly returns, but not in detail.

* 3·42 for 3·39, as given in previous part. The latter is the Registrar-General's, the former my own death-rate for the third quarter of 1892. In dealing with Leeds alone, and its parts, I fall back upon my own figures.

DIFFICULTIES OF NOTIFICATION.

At a meeting of the Farnham Rural Sanitary Authority on January 11th a communication was read from the Local Government Board, enclosing a copy of a letter addressed to them by Dr. Robinson, of Frensham, complaining of the action of the Farnham rural medical officer of health in regard to a case notified by the former as scarlet fever, and requesting that the officer's explanation of the proceedings should be sent by the authority.

The letter from Dr. Robinson stated that the case in question was that of Ada Deadman, aged 14 years, of Frensham. He notified it as a case of scarlet fever on November 17th, having been called to see it on the day previous. On the 19th he received notice from the girl's father that his services were no further required. He was informed that the medical officer of health was seen to leave Deadman's house on November 18th, and he attended the patient until death occurred, on November 22nd. The death was registered as typhoid. He protested against the medical officer of health having seen his patient behind his back. When he (Dr. Robinson) attended the girl, from November 16th to November 18th, there was no vestige of typhoid in her symptoms, but the symptoms were typical of scarlet fever. Dr. Lorimer read a report, in which he stated emphatically that the charge Dr. Robinson had made against him, of seeing the patient, Ada Deadman, behind his back and without his consent, was deliberately untrue, and in proof of his denial he submitted the statement of the girl's father, and Mr. Beale, his employer. On November 19th he (Dr. Lorimer) was prepared to have met Dr. Robinson at the house, and after he had obtained his sanction to superintend the removal of the case. He was then informed that the parents had requested Dr. Robinson to cease attendance, because they were not satisfied with his opinion of the case. It was only then that he (Dr. Lorimer) consented to attend the case, which, in his opinion, was a very grave one. Dr. Herbert Sloman was afterwards called in, and the girl died on the day following his visit. He (Dr. Lorimer) most respectfully protested against unfounded charges of that sort being made against a public officer in the discharge of a difficult and important duty. The written statements of the other persons mentioned were also read. Mr. E. Beale's was to the effect that, hearing that Dr. Robinson had notified a case of scarlet fever in the family of Deadman, he thought it best, if practicable, that the patient should be removed to the infirmary, and went to the house, but found both parents dissatisfied, saying that they did not think the girl was suffering from scarlet fever at all, and they would like another doctor to see her. He sent for Dr. Lorimer, who came to the house on the afternoon of the 18th, and told him he could not see the case without Dr. Robinson's consent. Dr. Lorimer arranged to come out next day and meet Dr. Robinson, or have the case removed to the infirmary if the latter had no objection. The parents requested Dr. Lorimer to see the girl, but he refused to do that under the circumstances. Afterwards he (Mr. Beale) saw Deadman and his wife and talked the matter over, and the result was that Deadman went to see Dr. Robinson on Saturday evening, the 18th, offered to pay him what was due, and told him that he did not require his services again. Dr. Lorimer came on November 19th, and attended the case to the end. Dr. H. Sloman's statement was that it was his most emphatic opinion that the girl was suffering from typhoid fever with lung complications.

The authority resolved to send a copy of their medical officer's report and the corroborative statements to the Local Government Board, with the intimation that the Authority begged to express their perfect confidence in their medical officer, and their great regret that he should be subjected to those continual attacks by Dr. Robinson.

Reported Outbreak of Scarlet Fever at Frensham.

At the same meeting Dr. Lorimer reported that 22 cases of scarlet fever were notified by Dr. Robinson as occurring between November 18th and December 28th at Frensham. The first case notified was that of Ada Deadman, who, however, died from typhoid fever with lung complications following influenza. It was remarkable that not one of the five children in the same house had the disease. One of the cases notified (a child named Shires) was removed to the infirmary for scarlet fever, but she died of diphtheria. He had asked Dr. Seaton to come down and arbitrate as to whether the cases were really scarlet fever, but as he (Dr. Lorimer) was unable to refute Dr. Robinson's statement, not having seen the patients, Dr. Seaton held that he had no *locus standi*. Subsequently to December 8th, 16 cases were notified by Dr. Robinson. He (Dr. Lorimer) personally visited eight households, and in only one (that of a person named West) did he find traces of scarlet fever having existed. He had no hesitation in saying that, with the exception of West's case, he believed the remainder of the cases investigated by him were cases of influenza. The Board decided that Dr. Lorimer's report on this matter should also be sent to the Local Government Board. —From the *Surrey Times*.

At Clerkenwell, on January 9th, a case came before Mr. Bros, in which the Vestry of St. Luke's was summoned for the non-payment of a fee of 2s. 6d. to Dr. Evan Jones, of Goswell-road. On July 4th last the complainant, under the Infectious Diseases Act, notified to the vestry a case of erysipelas. At the end of the year he sent in to the vestry a list of fees due to him for notifications, and the list was returned with a marginal note as to the case in question—"Not erysipelas." The vestry refused to pay the 2s. 6d. in this case. For the vestry, the medical officer of health was called. He stated that on receiving Dr. Jones's notification he called on the patient in question, and decided that there were no symptoms of erysipelas in the case. He thought she was suffering from a superficial abscess or mere blister. Mr. Bros said the complainant had notified a disease in accordance with his opinion, and was entitled to his fee. The refusal to pay had cast a slur on Dr. Jones's character. He must be paid the 2s. 6d. for which he sued, and five guineas costs.—*Times* report.

METHODS OF SEWAGE DISPOSAL.

By JOHN C. THRESH, D.Sc., M.B., D.P.H., etc.

IN a paper on the above subject contributed to the International Congress of Hygiene I classified the various processes in actual use under the following heads :—

1. Subsidence (*a*) with complete rest ; (*b*) during slow, but continuous, flow.

2. Mechanical straining and filtration.

3. Chemical filtration ; or percolation through materials exerting some chemical or catalytic action on the organic matters.

4. Precipitation by the addition of one or more chemicals. These may be (*a*) soluble, as the salts of iron and alumina and lime ; (*b*) insoluble, as clay, magnetic oxide of iron, and the various kinds of charcoal.

5. Electrolytic processes ; as Webster's (and Hermite's).

6. Oxidation and destruction of the organic matter by chemicals, such as the permanganates.

7. Sterilisation and disinfection by the destruction of micro-organisms, and the consequent arrest of putrefaction.

8. Nitrification, or the destruction of organic matter by the action of the nitrifying organisms found in surface soils.

9. Irrigation, or the utilisation of the organic matter as food for growing crops.

For details the original paper may be consulted, as time and space will only permit of brief references to works executed, and which claim to be successful.

1 and 2, alone, may at once be dismissed as being useless on the large scale,* though as adjuncts to other processes they are often of great importance.

3. This includes filtration through polarite, charcoal, and carbide of iron; but almost invariably some chemical is added to the sewage prior to the filtration, so that processes 3 and 4 are combined. At Newton Abbot, Devon, the sewage is first dosed with iron and alumina, then filtered through granulated carbonised lignite. The International Sewage Purification Company's process, which consists of first adding to the sewage "ferozone" and then filtering through "polarite" and sand, is employed at Acton, Hendon, Swinton, and many other towns, and so far has given very good results.

4. Precipitation processes have been very generally adopted, but in many instances have had to be supplemented by filtration through artificial filtering media or through land. The "lime" process is seen at its best at Birmingham, the A. B. C. (Alum, Blood, and Clay) process at Kingston-on-Thames, the aluminium process at Coventry, the alumino-ferric process at Guiseley and Eccleshill (Yorkshire), etc.

5. No electrolytic process is at present actually employed for the treatment of towns' sewage so far as I am aware, although Webster's process was favourably reported upon when tried at Crosness on a fairly large scale. Hermite's process will shortly be tried at Worthing, but its practical utility will probably be limited to towns on the coast or near the mouth of tidal rivers.

6. Oxidation of the offensive constituents by the use of permanganates has been carried on on an immense scale at the metropolitan outfalls, and the results are said to have been quite satisfactory. It is obvious, however, that such processes can only be used where the treated sewage is discharged into rivers having many times the volume of the sewage.

7. The Amines process claims to sterilize the sewage and prevent decomposition. Successful experiments were carried on at Wimbledon, and the process adopted. Some of the effluent, however, is afterwards used for irrigation processes.

8. The nitrification or intermittent downward filtration process is in use at Dewsbury, Hitchin, Merthyr Tydfil, and other places. At Dewsbury it is said to be very successful.

9. Irrigation processes alone *utilise* the sewage, and at the meeting of the international congress above referred to a resolution was passed to the effect that this was the only rational process of sewage purification. Many instances were quoted proving that where suitable land was available this process is also by far the most economical. The sewage farms at Beddington (Croydon), Chelmsford, Doncaster, Bedford, and Berlin may be quoted.

Full particulars of all the above and many other processes, together with the names of the engineers, plans, costs, etc., are given in Mr. Santo Crimp's work on "Sewage Disposal Works," and in Mr. Wardle's book on "Sewage Treatment and Disposal." The latter contains a description of "upwards of sixty sewage disposal methods of towns" in the United Kingdom. Corfield and Parkes' work on the "Treatment and Utilisation of Sewage" should also be consulted. These three books should be in the hands of every medical officer of health who desires to advise his authority as to what scheme to adopt "without wasting the money of the ratepayers." The subject is so large and important that a long series of papers would be required to treat it adequately, but I hope that the information afforded in this brief article may be of use to those who desire to become more fully acquainted with it.

* Except, possibly, when the effluent is discharged into the sea.

LAW REPORTS.

Exposure of a Scarlet Fever Patient.

At the St. Augustine's Petty Sessions on October 28th, before T. G. Peckham, G. Furley, and O. C. Waterfield, Esqs., Ellen Smith, of 31, Shaftesbury Road, Hammersmith, was summoned at the instance of the Local Board for the district of Herne Bay, for that while being in charge of Dora Smith she did wilfully expose such person in a public street, to wit Underdown Street, Herne Bay, while suffering from scarlet fever, without proper precautions.

Mr. R. M. Mercer, solicitor, Canterbury, appeared for the prosecution, and the defendant was represented by Mr. E. Smith, solicitor, London.

The defendant did not appear, and a medical certificate stating that she was unwell was handed to the Bench.

Mr. Mercer opened the case at some length.

Dr. Nicholas Constantine Collier, medical officer of health for Hammersmith, having been sworn, and being about to be examined by Mr. Mercer, said, "I wish the Bench to know that I have only attended out of respect to them. I am called upon to produce certain documents belonging to the Hammersmith Vestry; I have no power to produce them. If they wished them produced they should have subpœnaed the clerk to the vestry. I have come here without any of the documents mentioned in the subpœna."

Mr. Mercer, having read the subpœna, called for the production of the notification of the fact that Dora Smith was suffering from scarlet fever.

Dr. Collier: Which notification, if it exists, is not in my care or custody. As far as I know I have never seen it.

Mr. Mercer said that having regard to the course Dr. Collier adopted he should ask permission to treat him as a hostile witness. He then read a correspondence, in the course of which Dr. Collier demanded a fee of ten guineas with expenses; upon receiving which he would "carefully get up the evidence and see that you are supplied with copies of all letters and documents in reference to the case."

In the course of his examination, Dr. Collier stated that the notification of the case was in the possession of the clerk to the vestry, and he was advised that he was not entitled to show it about, as it was the property of the vestry. The further examination of Dr. Collier was as follows:—

You admit receiving the notification of June 5th? I should not like to swear to the date.

Did you on receipt of that visit the house personally? All the letters were received by the clerk.

From first to last did you ever visit the house? I never did.

Is it within your knowledge that the house was visited by an official? Sanitary Inspector Chamberlain informed me he had visited the house and done all that was necessary.

Did he report to you the result? I don't think he did the first visit. He reported to me something about the other visit, but I don't remember what.

Is it not the duty of the sanitary inspector to report to the medical officer of health? Not unless it is something out of the ordinary.

When would it be his duty to report? He would make his report in his report book, and that would be laid before the committee at their next meeting. It would not come before me.

Did you receive on June 19th a letter from Dr. Tench dated June 17th saying the child was going away? I received a letter from Dr. Tench something to that effect, no doubt.

Cross-examination continued: Assuming that this letter was received on June 19th, is it part of your duty as medical officer of health to give a certificate for taking the child away? It is not my duty to give a certificate.

Mrs. Lee, of 21, Underdown Street, Herne Bay, deposed that she was the wife of Abraham Lee, grocer, of 21, Underdown Street, which was a shop with a private house over. That on June 21st Mrs. Smith and her daughter came into the shop, and after some negotiations took apartments in her house. Mrs. Smith said that she had come to Herne Bay because she had been very unwell; nothing was said about her child having suffered from scarlet fever. She arrived on the Wednesday. On the Sunday following Alice Thake, her little servant, who had waited on the defendant and her daughter, became ill. Dr. Bowes was called in, and said that she was suffering from scarlet fever, and ordered her removal to the infectious hospital. Witness then went up into Mrs. Smith's room and told her of Alice Thake's illness, and asked her whether anyone in the house had had scarlet fever. The defendant then said that her daughter had had it about four or five weeks before, but was quite recovered from it. Alice Thake had only entered witness's employ on the day before the defendant arrived, and had only been in Herne Bay three weeks, and had during that time been staying with her aunt.

Cross-examined by Mr. Smith: After witness told Mrs. Smith that her servant had got scarlet fever she offered to allow Dr. Bowes to examine her daughter, and witness sent for Dr. Bowes, but before he arrived Mrs. Smith had packed up and gone to London.

Mrs. Lee was then cross-examined as to her servant's employment, and stated she was quite sure she had not been anywhere where she could contract the disease. She admitted she had demanded £15 for compensation for damages she had sustained.

Dr. Major Kirby Robinson deposed that he was

medical officer of health for Herne Bay, and medical officer of health for the East Kent Sanitary District. On June 8th he received a notification that Alice Thake was suffering from scarlet fever at Mrs. Lee's house in Underdown Street. He attended at the premises on the following day and found that the child had been removed to the infectious hospital. He thoroughly investigated the matter, and had come to the conclusion that Alice Thake, who had made the bed in which Dora Smith slept, contracted the disease in consequence, and that at the time when Dora Smith came to Herne Bay she was in a highly infectious state, considering that the case was notified on June 5th. He believed that scarlet fever cases were infectious from a period of from six to eight weeks after the first appearance of the disease. He had made a careful investigation into every case of scarlet fever that had occurred at Herne Bay, and during the past quarter not less than 75 per cent. of the cases turned out to be caused through the infection having been imported by visitors.

Mr. Smith said that with the permission of the Bench he would call his evidence first, and address the magistrates afterwards.

Dr. Edward Bevan Tench, of West Kensington, deposed that he was a member of the Royal College of Surgeons, and had been in practice for over 38 years. He had had much experience as a medical man, and also of the diseases of children, having had the charge of a training college at which there were 300 boys. He was called to Dora Smith on May 28th, and found symptoms of scarlet fever, but only a very slight rash; the temperature was 101°. He saw her again on June 1st; there were then no symptoms of the disease, the kidneys were not affected, and he thought her quite well. He saw her again on June 5th, and thought her quite recovered; she was not peeling, except a small spot on the thumb. He prescribed an ointment, with which she was anointed. A few days afterwards he allowed her to go into the garden. On June 15th he saw her, and found there were no signs of poison, and stated there was no danger in her mixing with her family. He considered her perfectly well. He examined her again on her return from Herne Bay, and found no evidence of infection. He considered that if there was no skin or throat or kidney trouble there was no infection at the end of three weeks.

Cross-examined by Mr. Mercer: He carefully examined the child to see if there was any evidence of peeling. He examined her feet; she put them out of bed for him to see. He personally saw to the disinfection of the room, and everything that was necessary was removed from it. He believed that Alice Thake contracted the disease by coming into contact with some lodger.

Mr. Smith then addressed the Bench at considerable length, and went through the evidence given on both sides, and submitted that the prosecution had not made out their case, that they had not shown that the child had been wilfully exposed, and that he had shown that proper precautions had been taken. He denied that the defendant was in charge of the child at the time.

The Bench retired, and on returning into Court the Chairman said: The Bench having very carefully considered the whole of the evidence in this case, have decided to convict the party charged with the offence. She will be fined £2 10s. and £4 19s. 6d. costs. With reference to Dr. Collier we make no order that he should receive any costs beyond the amount he has already been paid.

Mr. Smith asked the Bench to state a case for the opinion of the superior Court, contending that the evidence did not justify the conviction.

The Magistrate's Clerk pointed out that the objections raised by Mr. Smith were questions of fact, and that the judges would not deal with them.

The Chairman said the Bench had carefully considered the case, and saw no reason for acceding to Mr. Smith's application.—From *The Herne Bay Argus*.

OBITUARY.

We regret to announce the death of Dr. Henry J. Paine, at the age of seventy-eight years, whose name has been honourably associated with the sanitary history of Cardiff for half a century. For most of the following details of his career we are indebted to the *Western Mail*.

Fifty years ago Cardiff contained a population of 9,000. One of Dr. Paine's earliest experiences of it was that he caught typhus fever in the discharge of his duties as a district medical officer. The town was then under the government of street commissioners, whose power to raise loans by way of mortgage on the district rates was limited to £7,000. Dr. Paine had given considerable attention to the sanitation of towns, and on his recovery he was frequently consulted by the commissioners as to the best means of checking the high rate of mortality from zymotic diseases. In 1845 he was appointed medical officer of health for Cardiff, and continued in office until the end of 1887. In 1847 the Health of Towns Commissions was appointed, and in consequence of Dr. Paine's recommendations to the street commissioners, Mr. Rammell, an assistant commissioner, held an inquiry at Cardiff. His report pointed out the entire absence of drainage, a dangerously polluted water supply, and a mean annual death-rate extending over ten years of 30 per 1,000 of the inhabitants. The result of this inquiry was the issuing of a provisional order to place Cardiff under the provisions of the Public Health Act. Sir John Hawkshaw was called in by the local authorities, who planned the existing system of deep drainage, which, with its extensions up to the present time, has been carried

out at a cost of over £200,000. From his entry into Cardiff until he retired from the position of medical officer of health for the town, in December, 1887, Dr. Paine identified himself in the great work of improving the sanitary condition of the dwelling-houses and the health of their occupants. But for the persistent efforts of Dr. Paine, from 1839 to 1854, the deep drainage systems would, in all probability, have not been commenced until years afterwards.

During the potato famine in Ireland, about 1847, large numbers of Irishmen emigrated to Cardiff. They made their homes in an overcrowded locality, and brought with them typhus fever. In a very short time nearly 200 died from the disease. In 1849, only two years afterwards, cholera in an epidemic form broke out in Caroline Street, and soon spread throughout the streets adjoining. In a few weeks no less than 351 persons died from its effects. A house-to-house inspection was instituted by Dr. Paine, with a staff of voluntary assistants under him, and for many weeks he was untiringly engaged almost day and night in superintending and seeing that all the arrangements made were efficiently carried out At the first outbreak of cholera Dr. Paine removed several cases to a temporary hospital erected for the purpose, but on the second outbreak of cholera in 1854 he reversed the proceedings, removed those unaffected by the disease from the house on its first appearance, and though between 1849 and 1854 the population had increased to over 22,000, the number of fatal cases was only 172. On the occasion of the third outbreak of cholera in 1866 the number of fatal cases was reduced to 44.

The three great works with which Dr. Paine's name will remain associated are the provision of efficient main sewerage; the active measures taken to abate overcrowding in the poorer quarters of Cardiff; and the provision of a supply of pure water. It was to the latter that Sir John (then Mr.) Simon referred, when he expressed his opinion that Cardiff and England also are indebted to him for the saving of many hundreds of lives.

Dr. Paine was an advocate of the Birmingham system of poor-law medical officers, which excluded them from attending private patients, in order, as he believed, that the sick poor might have greater attention paid to them. His views on this and allied questions were given in further detail before the Royal Commission on Old Age Pensions, and will be embodied in the report of the Commission when published.

Asphalte Paving.—Dr. Dudfield, in a recent report, strongly advocates asphalte paving in respect of cleanliness. The higher first cost is compensated for by its durability, while the expense of scavenging is at a minimum. It is pre-eminently adapted for the paving of courts and alleys.

ANNOTATIONS.

The Eighth International Congress of Hygiene and Demography is to be held in Budapest in the first week of next September. The provisional programme recently issued for the Hygiene Division, shows a very elaborate and complete list of subjects for discussion. There are nineteen sections in this division, viz.:—

1. Ætiology of Infectious Diseases (Bacteriology).
2. The Prophylaxis of Epidemics.
3. The Hygiene of the Tropics.
4. The Hygiene of Trades and Agriculture.
5. The Hygiene of Children.
6. The Hygiene of Schools.
7. Articles of Food.
8. The Hygiene of Towns.
9. The Hygiene of Public Buildings.
10. The Hygiene of Dwellings.
11. Hygiene of Communication (Railroads and Navigation).
12. Military Hygiene.
13. Red Cross.
14. Saving of Life.
15. State Hygiene.
16. The Hygiene of Sport (Inurement and Care of the Body).
17. The Hygiene of Baths.
18. Veterinary.
19. Pharmacology.

Tests for Cholera.—The following process for the detection of the comma bacillus in fæcal deposits has appeared in the *St. Bartholomew's Hospital Journal*: 1. Examination of fresh stools or contents of ileum: If flakes in stool, ascertain whether they are composed of shed epithelium or of lymph corpuscles; the former is the rule in Asiatic cholera. Notice whether there are any motile bacilli, which in shape are commas or spirils; their movements are not straight, but like a screw moving. 2. Examination of stained specimens: Make film specimens on cover-glasses; dry and stain in alcoholic gentian-violet; search for comma-shaped or spiril bacilli. In typical rapidly-fatal cases of true Asiatic cholera they occur in flakes in great crowds, and generally in linear arrangement—in some places almost to the exclusion of other bacteria. 3. Inoculate with a trace of the flakes, traces containing peptone (1·0 per cent.) and salt (0·5 per cent.), in water, all previously sterilised. After six hours—better after ten or twelve hours—incubation at 37° C. there is distinct, though slight, turbidity, due to the multiplication of choleraic comma bacilli. Take off from the top layers a loopful, and make with this inoculations of a peptone tube, and from this dilution make cultivations in other peptone tubes and on the surface of agar. After twenty-four

hours pure cultivations of the choleraic comma bacilli are thus easily obtained. The peptone cultivations, if pure, or nearly so, give, on the addition of one or two drops of pure sulphuric acid, a characteristic rose-pink colouration, due to nitrates and indol. This reaction is shown after ten to sixteen hours' incubation of the peptone cultures at 37° C. 4. Gelatine plate cultivations are made with a particle of the flakes; after two or three days the characteristic colonies of the choleraic comma bacilli will be found if the case is cholera Asiatica; but this latter method, besides taking more time, is only successful if the flakes or stool originally contain a fair number of comma bacilli.

Isolation Beds in Fever Hospitals.—Dr. Caiger in his annual report as superintendent of the South-Western Hospital of the M.A. Board reports that of the 2,750 admissions during the year 116 were wrongly certified, and of these 20 developed the disease as certified after admission. The paramount importance of having an ample number of isolation beds in every fever hospital cannot be too strongly or too often insisted upon, in face of facts such as these. Patients suffering from some other definite form of disease can be easily disposed of. If no isolation beds remain unoccupied, it is better, in the interest of the patient himself, that he should be sent home again, rather than be subjected, or if himself suffering from another contagious affection, subject others, to the risk of contracting a second and possibly fatal disorder. It is the simply negative cases which are the difficulty—cases which, however certain one may feel about them in one's own mind, cannot be lightly returned, as their rejection may involve serious consequences, not only to the man returning them, but also to the private practitioner and to the patient's own friends. If such a case be admitted to the general ward and harm accrue it is true that the medical man originally certifying must bear the legal responsibility, but at the same time considerable moral responsibility must rest with the medical officer at the hospital, who, as a skilled and responsible official, is entrusted with the allocation of all cases sent up for admission. As the result of some years' experience in dealing with infectious disease, I hold strongly to the opinion that in every fever hospital there should be at least one bed in every fifteen reserved for isolation purposes. It is possible that in years to come, when the beneficial effect of practical instruction to students in the diagnosis of infectious disease has had time to make itself felt, that this proportion may be reduced; but the necessity for providing considerable means of isolation will always exist, if only in view of the fact that two or more infectious diseases are often co-existent in the same individual, to say nothing of the inexactness of medical science.

REVIEWS.

The Sewage Disposal of Isolated Dwellings. By W. Kaye Perry, M.A. (Dublin: 53, Upper Sackville Street.)—This pamphlet is a reprint of a paper read before the Institution of Civil Engineers of Ireland. In addition to a discussion of the general question, it contains plans and sections of the drainage of large mansions, and methods of disposal of the sewage.

How to Avoid Doctors' Bills. Six Lectures on "Public Health and Preventable Disease." By Sidney Davies, M.A., M.D.Oxon., M.O.H. Plumstead. (Woolwich: F. J. Cattermole. 28 pp. 4d.)—The object and scope of this useful pamphlet is indicated by the preface, which states "they do not pretend to any originality, but merely attempt to state the chief problems of hygiene in a simple way, with the object of interesting the general public of Woolwich and Plumstead in sanitation and sanitary administration. It is hoped, however, that they may be found useful for the same object outside the immediate neighbourhood to which they are addressed. The explanations and advice contained in them are sound and accurate; and they may be recommended to those requiring a convenient and readable summary of popular hygiene.

Dwellings of the People. By T. Locke Worthington, A.R.I.B.A. With an Introduction by Dr. G. V. Poore. (Swan Sonnenschein and Co. 1893.)

In the short space of 164 pages of large type Mr. Locke Worthington has given a comprehensive sketch of the very important question of the housing of the poor, more particularly from an architectural standpoint. It need hardly be said that the architectural portion of the volume is the most satisfactory and valuable. The chapters dealing with the legislation bearing on the subject, and with drainage and the disposal of house refuse, contain nothing new; and we would gladly have spared them in favour of further examples of the designs of cottages and other workmen's dwellings, which the book already contains.

A portion of the volume is an amplification of a paper read by the author before the Incorporated Society of Medical Officers of Health, and published in Public Health (May, 1893). The additional matter now given, and still more the illustrations giving plans and sections of workmen's dwellings, greatly increase the value of the book in its present permanent form.

Dr. Poore, in the introduction contributed by him, strikes the right note when he states that "a house has not merely to be looked at, but also to be lived in": and it is the neglect of this principle in the past by the majority of architects that has produced such serious sanitary blunders.

Unlike many architects, the author accepts the minimum angle of 45° (from the sill of the windows on the ground floor of the buildings on the opposite side of the adjoining street or area to the top of the building in question), which has been advocated by the London County Council. He further thinks that the maximum height of block dwellings should be restricted to 50 feet. In the chapter on "Old Cottage Property" interesting particulars are given of the method adopted in Manchester for converting back-to-back into "through" dwellings.

The designs for cottage-flats are ingenious and useful. They are preferable to larger houses, which practical experience shows are commonly sub-let, without the necessary structural arrangements for sub-letting. The chapters on "French Cottages and French Block Dwellings" enable an interesting comparison to be made with English designs. The value of the chapter on "English Block Dwellings" would have been increased by further details as to defective arrangements in objectionable blocks, thus illustrating the dangers to be avoided. According to Mr. Charles Booth, block dwellings may be divided into five classes, viz., very good, good, fair, bad, and very bad; the three latter divisions, according to the same authority, comprising one-half of the blocks which have been erected during the last fifty years in London.

CORRESPONDENCE.

MIDWIVES REGISTRATION ASSOCIATION.

To the Editor of PUBLIC HEALTH.

SIR,—We beg to call your attention to the above association which has been formed in order to obtain a practical solution of what is known as the "Midwives Question." The want of a society specially devoted to this object has been much felt, all through the agitation which has been going on intermittently for more than twenty years. The formation of this association has, therefore, been welcomed by those who rightly appreciate the importance of the question.

Since two Select Committees of the House of Commons have recently reported in favour of an Act to render compulsory the registration of midwives, such an association has been still more needed in order that medical practitioners may be recognised as the proper persons to undertake the duties of examining midwives and supervising their practice.

Our association, therefore, solicits the co-operation of all those members of the profession who agree that legislation is required, and who think it desirable that the medical profession should have a voice in the matter.

An executive committee, consisting of both general practitioners and consultants, has been appointed, and is at present engaged in considering the many important questions raised by the prospect of legislation. Medical societies interested in the matter are represented on this committee by duly appointed delegates.

We shall feel greatly obliged to medical practitioners in any part of the country who will furnish us with local information bearing on the question.

We append copies of papers now in circulation.—We are, etc.,

ROBERT BOXALL, M.D.,
29, Weymouth Street, W.
LOWLAND HUMPHREYS,
27, Fellows Road, N.W.
} Hon. Secretaries.

London, January 6th, 1894.

A CORRECTION.

To the Editor of PUBLIC HEALTH.

SIR,—A paragraph in your current issue, headed "Staff of Sanitary Inspectors in London," states on the authority of Dr. Warry that Plumstead is least efficiently manned with inspectors of the southern districts, having one inspector to 29,513 inhabitants. Dr. Warry has evidently fallen into some error. Plumstead parish, population at census 52,436, has three full inspectors, one dust inspector, and a clerk employed wholly in the sanitary department. For the rest of the Plumstead Sanitary District there are at least three inspectors, making for the whole seven inspectors to 95,000 population, or one per 14,000.—I am, etc.,

SIDNEY DAVIES, M.O.H. Plumstead.

DIARRHŒA FROM IMPURE WATER.—In a large factory in Schenectady, N.Y., employing 2,000 hands, much inconvenience was felt, independent of season, from prevalence of diarrhœal diseases amongst workmen, sometimes to the extent of 10 per cent. of the employés. The company substituted distilled water for that from the river Mohawk, allowing no other in the works. The improvement in the health of the hands was so marked that arrangements are being made to supply the families of the operatives as well, and another firm is about to adopt the same practice.—*Thirteenth Report State Board of Health of New York, p.* 514.

APPOINTMENTS.

MEDICAL OFFICERS OF HEALTH.

BARTON, SAML J., M.D.Dubl., appointed M.O.H. for the St. Faith's R.S.D.

COLE, T.W., B.A. Dubl., M.B., appointed M.O.H. to the Bolsover Local Board.

CROWTHER, THOS., M.D., M.R.C.S, appointed M.O.H. for Warley, Luddenden Foot, and Midgley.

ETCHES, WM. R., M.R.C.S., L.R.C.P., D.P.H., appointed M.O.H. for the Macclesfield U.S.D.

FARR, ERNEST A., L.R.C.P.Lond, M.R.C.S., appointed M.O.H. to the Andover U.S.D.

JONES, F. FELIX, M.R.C.S., L.S.A., D.P.H., reappointed M.O.H for the combined districts of the Llanfyllin Union.

KENWOOD, H. R., M.B., C.M.Edin., D.P.H.Eng., appointed M.O.H. for the Finchley U.S.D.

LAVERICK, JOHN V., L.R.C.P.Lond., L.F.P.S.Glas., appointed M.O.H. to the Whitby R.S.D.

LAKE, WM. WELLINGTON, M.R.C.S., D.P.H.Camb., appointed M.O.H. for the Woking U.S.D.

MASON, WM., M.B., C.M.Aberd., appointed M.O.H. to the Cottingham Local Board.

MOLINEUX, JAS., M.D St. And., M.R.C.S, appointed M.O.H. to the Sculcoates R.S.D.

SHEPHERD, A. W., L.R.C.P. and S.I., appointed M.O.H. to the Cowbridge Town Council.

VINCENT, HENRY BIRD, M.R.C.S., L.S.A., appointed M.O.H. for the Mitford and Launditch R.S.D.

WEBB, WM. H., M.D.Durh., appointed M.O.H. to the Kingsbridge Local Board.

YOUNG, MEREDITH, M.B., C.M.Edin., appointed M.O.H. to the R.S.D. of the Halifax Union.

MEDICAL OFFICERS OF FEVER HOSPITALS.

COLGAN, F. PHILIP, L.R.C.P. and S.I., appointed medical officer to the Carlow Fever Hospital.

RICKETTS, T. F., B.Sc.Lond. M.D., appointed medical superintendent of the Hospital Ships of the Metropolitan Asylums District.

OTHER APPOINTMENTS.

FARQUHARSON, GEORGE S., M.B.Lond. Univ., M.R.C.S.Eng., L.R.C.P.Lond., appointed sanitary surveyor of the Board of Trade for the Port of Southampton (jointly with Dr. Grange).

GRANGE, FRANK, M.D.Lond. Univ., D.P.H.Camb Univ., M.R.C.S.Eng., L.R.C.P.Lond., appointed sanitary surveyor of the Board of Trade for the Port of Southampton (jointly with Dr. Farquharson). Also appointed medical superintendent of quarantine under the Privy Council.

SUBSTITUTES FOR WHITE LEAD.—Professor Laurie recently stated at the Society of Arts that there are at least two preparations on the market which are as valuable commercially as white lead, whilst they do not share its deleterious qualities. These are sulphate of lead and oxide of zinc. A mixture of the two, known as "Freeman's White," has been proved to have greater covering power as a pigment than white lead, whilst oxide of zinc keeps its colour for a much longer time in impure air, and is therefore valuable for interior work.

WANTED, copies of PUBLIC HEALTH for October, 1892. Full price given by Publisher.

PUBLIC HEALTH,

The Journal of the Incorporated Society of Medical Officers of Health.

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ADVERTISEMENTS. — *Communications relating to Advertisements should be addressed to Messrs. W. H. & L. Collingridge, 148 and 149, Aldersgate Street, E.C.*

Every Reader of a Paper before the Society, or Contributor of a Signed Article, is entitled to twenty-five copies of the issue of PUBLIC HEALTH *containing the contribution in question; but application for this or any smaller number must be made to the Editor not later than the* TWENTY-FOURTH *day of the month previous to insertion of the Contribution.*

Medical Officers of Health and other Correspondents are requested to send regularly all published reports and matters of interest bearing upon Sanitation to the Editor, 11, *Gloucester Place, Brighton.*

NOTICE.

THE INCORPORATED SOCIETY OF MEDICAL OFFICERS OF HEALTH.

20, Hanover Square, London, W., February, 1894.

NOTICE is hereby given that an ORDINARY MEETING of the SOCIETY will be held at No. 20, HANOVER SQUARE, W., on MONDAY, the 19th day of MARCH, 1894, at 7.30 p.m, for the transaction of the undermentioned business:—

AGENDA.

1. Minutes.
2. Report of Council.
3. To Elect Candidates. The following candidates have been duly nominated for election:—

As Fellows—

L. W. DARRA MAIR, M.D., 25, Dingwall Road, Croydon, M.O.H. Croydon R.S.D.; proposed by JOHN C. THRESH, seconded by F. P. WIGHTWICK.

JOHN ALEX. HEDGES, Rulland House, Leighton Buzzard, M.O.H. Leighton Buzzard U.S.D.; proposed by JOHN C. THRESH, seconded by F. P. WIGHTWICK.

W. WELLINGTON LAKE, D.P.H.Camb, M.R.C.S.Eng., Worplesdon, near Guildford, M.O.H. Guildford R. and Woking U.S.D.'s; proposed by W. COLLINGRIDGE, secoonded by F. P. WIGHTWICK.

EDWARD H. W. SWETE, M.D., D.P.H., Fort Royal, Worcester, M.O.H. Droitwich R.D.; proposed by S. R. LOVETT, seconded by F. P. WIGHTWICK.

HENRY WISKEN, L.R.C.P. Edin., L.F.P.S.Glas., Hazelthorpe, Heywood, M.O.H. Heywood Ml. Borough; proposed by CHARLES E. PAGET, seconded by FRANCIS VACHER.

ABRAM THOMPSON, M.D, M.R.C.S., Lightburne, Ulverston, M.O.H. Ulverston U. and R.S.D.; proposed by CHARLES E. PAGET, seconded by FRANCIS VACHER.

GEORGE HALL, M.D. and C.M.Edin., Milford, Godalming, Surrey, M.O.H. Hambledon R.S.D.; proposed by EDWARD SEATON, seconded by WELLINGTON LAKE.

GEORGE FREDERICK PHILLPOT, L.R.C.P., Ceely House, Aylesbury, Bucks, M.O.H. Aylesbury R.S.A.; proposed by S. R. LOVETT, seconded by F. P. WIGHTWICK.

GEO. WM. SIDEBOTHAM, M.R.C.S., L.S.A., 34, Church Street, Hyde, M.O.H. Borough of Hyde U.S.D.; proposed by CHARLES E. PAGET, seconded by FRANCIS VACHER.

As Members—

EDWARD H. EZARD, M.D., D.Sc.Edin., 220, Lewisham High Road, S.E.; proposed by H. W. ROBERTS (per F. P. W.), seconded by F. P. WIGHTWICK.

ROBERT N. DENNING, B.A., M.D., L.R.C.P.I., L.M., Elland, Yorkshire, M.O.H. Elland U.S.D.; proposed by ARTHUR WHITELEGGE, seconded by J. WRIGHT MASON.

G. HODGSON HIGGINS, M.R.C.S.E., L.R.C.P., 1, Brighton Terrace, Heckmondwike, M.O.H. Cleckheaton R.S.D.; proposed by ARTHUR WHITELEGGE, seconded by J. WRIGHT MASON.

J. ERNEST COLBY, M.A., M.B. and S.Cb., L.R.C.P., F.R.C.S.E, The Mount, Malton, M.O.H. Malton R.S.D.; proposed by ARTHUR WHITELEGGE, seconded by J. WRIGHT MASON.

As Associate—

THOMAS DE COURCY MEADE, Mem.Inst. Civil Engineers, Belmont, Muswell Hill, London, N., Engineer and Surveyor, Hornsey Local Board; proposed by CHARLES PORTER, M.D., seconded by ARTHUR NEWSHOLME, M.D.

4. Nomination of Candidates.
5. Correspondence.
6. Miscellaneous business.
7. At 8 o'clock, a Discussion will take place on "DEATH CERTIFICATION AND REGISTRATION," which will be opened by Dr. F. W. Lowndes, Liverpool, and Dr. Eustace Hill, M.O.H. Durham County Council. A number of medical officers of health and others have promised to take part in the discussion.

F. P. WIGHTWICK,
55, Upper Brook St., Grosvenor Sq., W.
J. C. THRESH,
The Limes, Chelmsford.
Hon. Secs.

VACCINATION AT LEICESTER.—From a return recently made to the Leicester Board of Guardians, it appears that infantile vaccination has fallen into almost complete desuetude in Leicester. Of the 8,890 children who were born in the borough during the eighteen months which ended on June 30th last, only 186 were certified as being successfully vaccinated.

PROCEEDINGS OF THE INCORPORATED SOCIETY OF MEDICAL OFFICERS OF HEALTH.

A MEETING of the Incorporated Society of Medical Officers of Health was held at No. 20, Hanover Square, on Monday, February 19th, 1894. Present: The President (Dr. W. T. G. Woodforde) in the chair, Drs. Seaton, Vacher, Gwynn, Wilde, Skinner, St. Clan Shadwell, Sanders, Renner, Young, Hamer, Allan, Kenwood, Dickenson, Sykes, Newsholme, Clemow, Sisley, Parkes, Harvey Littlejohn, W. R. Smith, Willoughby, Haughton, Weaver, Davies, Bernays, and Drs. Wightwick and Thresh, Hon. Secs.

The minutes of the last meeting of the Society on January 15th, 1894, were read, approved, and signed by the Chairman.

REPORT OF THE COUNCIL.

The HON. SECRETARY read the report of the Council:—

(*a*) That the Council have received a letter from the Assistant Secretary of the Local Government Board, stating that the Board has fixed Tuesday, February 20th, at twelve o'clock noon, as the date for the proposed conference respecting the suggested constitution of a Joint Board for the purpose of holding examinations for sanitary inspectors, and the granting of certificates of competency, under Section 108 (2) (d) of the Public Health (London) Act, 1891, and stating that the number of representatives should not be more than three; and reporting that they have requested Dr. Woodforde (the president), Dr. Wightwick, and Mr. Henry C. Jones (the hon. solicitor) to attend the conference as representatives of the Society.

(*b*) Reporting that, in view of the increased number of branches of the Incorporated Society of Medical Officers of Health, and of the increased demand on the space of the journal, the Council have authorized that the size of PUBLIC HEALTH be increased by eight pages during eight months in each year.

(*c*) Recommending that a sum of £50 per annum (from the funds received from the Berridge legacy) be placed at the disposal of the editor for the payment of contributors of original articles, etc., and to meet other expenses in connection with the journal.

(*d*) Recommending that a certain portion of the income from the Berridge Trust be allotted for the purchase of books on special branches of sanitary science, but that the amount to be so allotted be not fixed until a room for the library has been secured, and that the Secretary be instructed to advertise for rooms suitable for the general purposes of the Society.

(*e*) Reporting that the Council have requested the President, Dr. W. T. G. Woodforde, to represent the Society at the International Medical Congress to be held at Rome.

Resolved, on the motion of Dr. SEATON, seconded by Dr. GWYNN, that the same be received and adopted.

Election of Fellows, etc.—The following gentlemen having been duly nominated for election, a ballot was taken, and they were declared by the CHAIRMAN to be unanimously elected.

As Fellow—

HERBERT WILLIAMS, M.D., London, Cert. Public Health, London University, 22, Cheyne Grove, Chelsea, Assistant M.O.H. Port of London.

As Member—

EDWARD HENRY LEMON, M.R.C.S., L.R.C.P., D.P.H., Ireland, Croydon Infirmary, Surrey.

Nominations.—A number of candidates were then nominated for election at the next meeting.

VAGRANTS AND THE DISSEMINATION OF DISEASE.

The meeting then proceeded to consider the report of the committee appointed at the last meeting with reference to this subject.

The HON. SECRETARY read the following report, recommending:—

(*a*) That in view of the undoubted fact that dangerous infectious diseases are largely spread by vagrants in their wanderings from place to place, the Incorporated Society of Medical Officers of Health desire to represent to the President of the Local Government Board the necessity that, in their opinion, exists for obtaining further powers for sanitary authorities, in order that so far as may be practicable vagrants may be prevented from carrying infection about the country, especially in epidemic times, and that for this purpose it is desirable—

1. That all persons admitted to casual wards or common lodging-houses should be medically examined on admission to the same, or as soon afterwards as may be practicable.

2. That means should be taken for causing the movements of vagrants, other than those admitted to casual wards or common lodging-houses, to be recorded, and reported to the sanitary authority of each district they may be in or may enter, as often as may be required.

3. That sanitary authorities, or the police when requested by the sanitary authority, should have power to detain for medical examination any vagrant found wandering in any public place who is reasonably suspected of being in a condition to spread the infection of any dangerous disease.

4. That when considered requisite for preventing the spread of any dangerous infectious disease, vagrants should be subject to disinfection and to detention for such time as the sanitary authority of the district in which they are may consider necessary for the protection of the public health.

5. That the expenses incurred by the sanitary authority under the foregoing heads be chargeable as general expenses.

(*b*) That copies of the preceding resolution be forwarded to the President of the Local Government Board, the Chairman and Clerk of the County Council of the administrative County of London, and the Chairmen and Clerks of each of the County Councils of England and Wales, and to the Clerks of the 117 large authorities which notify weekly to the Local Government Board.

The Hon. Secretary read the following letter from Dr. Armstrong :—

Health Department, Town Hall, Newcastle-upon-Tyne, February 13th, 1894.

Dear Mr. President—Infectious Diseases and Vagrancy.—With your approval I should like to suggest that a copy of the resolutions should be forwarded to the clerk to every urban sanitary authority on the list of 117 large authorities whose infectious cases are issued weekly by the Local Government Board. This will enable the said authorities to understand the question which they are likely to be invited by the London County Council to discuss very soon. Perhaps you will kindly—if you approve of my proposal—put it to the members at the February meeting, which I fear I shall not be able to attend.—I am, dear Mr President, yours sincerely, Henry E. Armstrong.

After discussion it was resolved that after the words "Local Government Board" in recommendation *b*, the words "and after the receipt of their acknowledgement it be then sent to" be inserted.

The recommendations were then considered seriatim and approved, and on the same being put to the meeting the Chairman declared the report as amended to be unanimously adopted.

Eighth International Congress of Hygiene and Demography.

The President: A letter has been received from the President and Secretary of the Eighth International Congress of Hygiene and Demography, which will meet in the autumn of this year at Budapest, inviting the Society to appoint delegates to represent it at the Congress. The Council have had the letter before them, and it is thought desirable that the Society should be as largely represented as possible. With this end it is suggested that any Fellow who intends to be present at the Congress, and is willing to be delegated as a representative of the Society, should forward his name to Dr. Wightwick, before March 7th, in order that he may be able to send in a full list of delegates to the executive committee of the Congress.

Vaccination and the Laws Relating thereto.

A discussion on this subject was opened by Dr. Seaton, medical officer to the Surrey County Council.

Dr. Seaton, in opening the discussion, stated that he took it the reason the honour of opening so important a discussion had been given to him was that, although he had never claimed to be an authority on vaccination himself, it was well known that his father took a very deep interest in the promotion of vaccination, and he regarded it therefore rather as a token of respect for his father's memory than as an indication that he himself was the most fit person to undertake a very difficult duty. When he was asked to introduce the discussion, his first feeling had been that the subject was so large and complex that he would rather not have that task to perform. He remembered that a Royal Commission was sitting, and had been sitting for a very long time, and it would be extremely difficult for him to speak as he would like to. With regard to the immense value of vaccination, he had no hesitation in speaking about it, because he was addressing colleagues, and he presumed they were all of one mind on the subject. They all knew very well that vaccination was the greatest possible boon to them. They were continually called upon, in the execution of their duty, to visit small-pox cases, and without vaccination they could not do so except with the greatest possible risk to themselves and their families, and, therefore, as a matter which affected themselves personally, he hardly thought there could be room for any difference of opinion. Then again, to view the matter from an official standpoint, if they had to face a rising epidemic of small-pox without a proper system of vaccination, there was hardly one who would not regard the official responsibility he would have to incur with a feeling of dismay. The Vaccination Commission had, he continued, been sitting for a very long time, and during that time certain changes in the law which might be desirable and practicable had been talked of. The one which interested them generally was the one he would refer to specially in his few introductory remarks. He would speak, at the outset, of the evidence given by the Right Hon. James Stansfeld, M.P., before the Royal Commission, and with reference to the evidence of that statesmen, he would remind the meeting that anything he (Mr. Stansfeld) said was bound to carry very great weight, because his views had great influence with those who were opposed to any sort of interference with what was termed "the liberty of the subject," and might be taken as the representative opinion of a particular sect of politicians. The evidence given some three years ago had only just lately seen the light, for although the Commission had been sitting for four or five years, it was only recently that the fourth report had been published. Mr. Stansfeld (p. 140 of the Report), in speaking of any possible change in the administration of the vaccination laws, dwelt on the desirability of entrusting county councils with their administration. With reference to that particular part of his evidence, he (Dr. Seaton) thought it seemed remarkable that the witness should not have been asked whether he expected that the administration of any vaccination system would be taken up in a proper spirit by new authorities unless vaccination received its due

honour and credit. The Right Hon. James Stansfeld, M.P., had also spoken in his evidence about compulsion, but with regard to that, he (Dr. Seaton) did not propose to offer any observations at all. It might be left to the Royal Commission. There were certain other parts of this evidence, however, to which he proposed to address himself. Mr. Stansfeld was very much impressed with the importance of "decentralisation." Any one who had lived, as he (the speaker) had done, for some time, in a fairly important provincial town, felt the need for decentralisation for the purposes of good government. That was to say, taking away certain powers related to administration from the Local Government Board at Whitehall and placing them in the hands of the municipal and county authorities. To turn to another point, viz., the prevention or control of small-pox by other means than vaccination. It was somewhat surprising to find that the eminent statesman whose evidence he (the speaker) was now discussing, had not made any very special point of the influence of notification and hospital isolation. With regard to his (Dr. Seaton's) own official experience on this question it related to a period as far back as 1873, when he was appointed as medical officer of health of a fair-sized town. One of the first cases of difficulty he had to deal with was an outbreak of small-pox. He at that time was so thoroughly imbued (indeed, he still is) with the paramount importance of vaccination as a means of stopping the spread of small-pox, that his only concern was to get at the people and direct them how they could obtain safety by means of vaccination and revaccination, but he found that, however strong his own opinion was, it was certainly not the prevailing opinion of the 200,000 people amongst whom he lived. Their opinion, undoubtedly, was that the chief way of preventing small-pox was by taking the infection out from amongst the people. And his attention was subsequently very much directed to the influence of isolation as a dependent or an accessory of vaccination. Since that time very considerable changes had taken place in the health and medical departments of the Local Government Board. Somewhere about 1880, as all of them knew, his friend, Mr. W. H. Power, made a most remarkable observation as to the spread of small-pox for great distances round hospitals. He (Dr. Seaton) had the greatest possible respect for Mr. Power and admired his sagacity, accuracy, and thorough reliability, but he had also a very strong opinion that his (Mr. Power's) observations, through being constantly brought before the public for more than twelve years, had led to a most exaggerated estimate of the danger (which, if it existed, was very small), and had thus made it well nigh impossible for hospitals for the isolation of small pox patients to be established. The Local Government Board had the high function of giving them scientific facts upon which subsequent administration could be based. But while indicating what they believed to be a risk or danger, surely they might be expected to indicate its extent and proportion. He (the speaker) might compare the danger of an extra urban small-pox hospital with what had been stated about the danger of erysipelas in connection with vaccination properly performed. It was really so infinitesimal as to be practically non existent, and he contended that the danger of small-pox hospitals outside towns was also virtually nil.

Returning to the subject of the discussion, Dr. Seaton, continuing, drew the attention of the meeting to the extremely suggestive evidence of Mr. Stansfeld, given with special reference to his well-known views as to the administration of vaccination law. Mr. Stansfeld in the course of his examination had said—

"I have always thought that it would be a great advantage to decentralise and to decrease the area of supervision. I think, if instead of having the present system, of which the Commission is perfectly informed, you were to have a county system, you would then have county opinion brought to bear upon the subject; you would have county professional opinion brought to bear upon it, and you would have greater personal knowledge of the members of the profession employed in vaccinating on the part of those who have to supervise them, than can exist in conducting all these operations from a centre."

"I would distinctly propose that the system of supervision should be conducted by the medical officers of health of the county councils, leaving it to be considered what should be the relationship between those medical officers of the county council and the medical department of the Local Government Board. I think their supervision would be more effectual. I think at present it seems rather like an attempt at the system of payment by results, which has been exploded of late, so far as regards the Education Department; and which I do not think answers very well here. The inspectors of the Local Government Board make triennial visits; they see the performance of the operation, and they inspect the instruments—they may find them dirty; they may have been dirty any time during the last three years; they judge of the fulfilment of the duty as well as they can, and they withhold the reward if they think it is a case for withholding it. I do not know to what extent it is withheld, no doubt that is before the Commission; I assume that the Government reward is appropriated to the public vaccinators in the considerable majority of cases, but that the minority is a sensible minority of persons who do not earn it, who are therefore admittedly unfit."

With reference to the part of the subject and to the evidence which Mr. Stansfeld had given, Dr. Seaton thought it might be desirable to consider

what were the objections under the present system, so far as the administrative authority was concerned. He thought every one who had seen much of the practical work of vaccination would say they owed a deep debt of gratitude to boards of guardians, who had carried out under very great difficulty a most important work in this country; but at the same time he had thought for many years that the boards of guardians were not the proper vaccination authority. The experience to which he had already referred was having to meet a rising epidemic of small-pox. He then found a very great difficulty in getting a supply of vaccine lymph just when and where it was most needed. The public vaccinators were personal friends of his, and always did everything he asked as far as they could; but he wanted more than that. He went to the Town Council and told them they must give him *carte blanche* to do everything in the way of vaccination to limit the disease, and they did so. They placed a sum of £500 under his supervision with a direct view to preventing the spread of small-pox. He thought that sort of thing ought to be adopted throughout the country, so that vaccination could be carried out under the supervision of the medical officer of health in the best possible manner. The experience to which he had just referred was now over twelve years ago, and since that time he had been disappointed to find that very few of the big towns had taken up that idea. If they went to Lancashire, Yorkshire, and the Midlands they found very few sanitary authorities had adopted the idea of preventing small-pox by providing, from their own means, vaccine establishments. Referring to the animal vaccine station in London, he asked why had not other similar stations been established in the great centres of population? It was depressing to find our great city councils failing to appreciate the importance of preventive medicine to stop disease. His own view was expressed in an article he had written for the coming edition of "Quain's Dictionary of Medicine," in which he said, "The chief advantage that belongs to the system of animal vaccination is, in the opinion of the present writer, that it may afford the opportunity of re-vaccinating simultaneously large numbers of persons who are exposed to the immediate danger of small-pox, as, for example, the inmates of a workhouse into which a case of small-pox has been introduced, and where the means of isolation are very imperfect. In order to facilitate the supply of lymph for such a purpose it would be well if several national or municipal animal vaccine stations could be established near to large centres of population in the North and in the Midlands, as well as in the South of England; such stations to be open to the public like that at Lamb's Conduit Street, and to be available for supplies of lymph where the immediate revaccination of a large number of persons is necessary to prevent the spread of small-pox." Resuming, he stated that was one means of popularising vaccination. Mr. Stansfeld, to whose views he attached great weight, believed very strongly in the influence of the county councils in matters of local government, in popularising such a great preventive measure as vaccination. The county councils, as they knew, had already taken a very active part in the promotion of technical education, and might it not be expected, he asked, that they would be the authorities who would be likely to popularise such a great preventive measure as vaccination? The great stumbling block under the present arrangement was the tradition which ran through all poor law work, viz., to do just as little—in the way of expenditure—as was necessary to comply with the strict letter of the law; the minimum required in expenditure thus generally become the maximum. That poor law tradition had been the great obstacle in the way of the popularisation of vaccination. Referring to county councils, Dr. Seaton stated he had the honour of being an officer of one of the county councils, and he felt he ought to speak very cautiously. They had yet to learn how far the county councils would be likely to undertake the work of providing for systematic public vaccination, and then how far they would be likely to do it efficiently. With regard to the first consideration, viz., how far they would be willing to undertake the work, he had already pointed out that unless the subject of vaccination received its due honour and credit, unless this great discovery of Jenner's was held up as it should be, it was not likely that any new class of authority would take up the work of its administration in a proper spirit. With regard to the next point, how far they could carry it out efficiently, they would have to consider the work of the councils during the short period they had been in existence. There were some few county councils who had taken responsible medical advice on questions having an important bearing on the public health, but Dr. Seaton was afraid many had not done so. He thought it was their duty to speak very plainly and tell the county councils they must not expect to do preventive medical work too cheaply. He had had some experience. He had seen so called isolation hospitals established, and he had seen the most disastrous results from the establishment of places which ought never to have been used for such purposes, and therefore he said that they should give authorities notice that they would not lend themselves to such methods. In the same way he thought they should let it be understood they would not lend themselves to the establishment of any method for carrying out vaccination in any but the best possible manner. In conclusion, he stated that what he had said was simply by way of introduction, with a view of eliciting observations and opinions on the subject.

Dr. PARKES (Chelsea) was afraid the people in this country would never look upon vaccination in the light that medical men regarded it, until compulsion was done away with. It seemed difficult for them to recommend that compulsion should be done away with, but the question arose whether the people were not now sufficiently educated to understand the great efficacy of vaccination if they did not regard it in the very unfavourable light of compulsion. They knew, of course, that when it was gratuitous and not compulsory the small-pox death-rate was much higher than it had been since, but there was no doubt that education then was not so general as at the present time, and it was quite possible that an experiment, if tried now, of doing away with compulsion and providing gratuitous vaccination might establish its popularity and induce even a greater number of people, to bring forward their children to be vaccinated than at present. He certainly thought that vaccination should be taken out of the hands of the poor-law authorities and placed in the hands of sanitary authorities, preferably county councils. Anything enforced by the poor-law was to a certain extent tainted in the minds of the masses.

Dr. SYKES (St. Pancras) said although Dr. Seaton had not exactly expressed it, he took it that the thread that ran through his arguments was the substitution of emulation among county councils as against compulsion by the Local Government Board.

Dr. SEATON: No, that was not so. I do not see how we can do without compulsion.

Dr. SYKES: I am glad to be put right on that, because if compulsion by the Local Government Board was abolished, the county councils would have to take it up, and it would only be a transference of administration without touching the principle. Dr. Seaton had stated that the guardians had expended the minimum amount, and that large local authorities had not provided for vaccination, which showed that guardians and local authorities would not as a rule enforce it without compulsion. Even in the one instance Dr. Seaton had quoted, of a large town undertaking the work, it was not until an epidemic was on them that they had done so, and it was the same in Bradford at present. Would it be possible in such a state of things to vaccinate the country in time to prevent a dire calamity? He thought when they once got fixed the idea of the necessity for compulsion, the mere administration became a simple matter. The transference from the guardians to the sanitary authorities of the administration of the Act was, no doubt, very important. The fact that they were the present vaccinating authority operated against the popularity of the work, particularly amongst the poorer classes, for the nearer an individual got to pauperism the more strongly did he dislike the "house" and all connected with it. Referring to the institution of permanent calf lymph stations by large town authorities, Dr. Sykes asked why had not the Local Government Board established them? They had one in Lamb's Conduit Street. Why had they not established half-a-dozen others? As to Mr. Stansfield's remark about about private vaccinators, that was very easily remedied. He thought medical men should be under a little compulsion also. They should certify the area vaccinated, and they would then have security that a proper area was vaccinated.

Dr. WIGHTWICK (Southwark) said Dr. Sykes had laid great stress on the fact that certain authorities had not taken up this question except in epidemic times. They must not forget that it was not part of the duty of those authorities to do so; if it was made part of their duty he thought they would be much more willing to undertake the work voluntarily than by compulsion. The whole odium of vaccination was because it was compulsory. He believed if it was voluntary the public would soon see its advantage. Compulsion, too, raised a very objectionable person—the "British martyr"; and as a matter of fact, vaccination was not really compulsory. In his district he had found among the children admitted to the workhouse the following percentages unvaccinated:—

Ages of Children on Admission.	Percentage of Unvaccinated at different Age periods.
3 months and under 12 months	26 per cent.
1 year and under 2 years	40 ,,
2 years ,, 3 ,, ...	58 ,,
3 ,, ,, 4 ,, ...	13 ,,
4 ,, ,, 5 ,, ...	17 ,,
5 ,, ,, 6 ,, ...	20 ,,
6 ,, ,, 7 ,, ...	10 ,,
7 ,, ,, 8 ,, ...	13 ,,
8 ,, ,, 9 ,, ...	7 ,,
9 ,, ,, 10 ,, ...	4 ,,
10 ,, ,, 11 ,, ...	18 ,,
11 ,, ,, 12 ,, ...	4 ,,
12 ,, ,, 13 ,, ...	0 ,,
13 ,, ,, 16 ,, ...	3 ,,

This was about 19 per cent. unvaccinated up to 16 years of age, and yet they kept up the odium of calling it compulsory. He thought the administration of the Acts should be taken away from the Poor Law and placed in the hands of the sanitary authority. He urged that the operation should be considered as of a more serious nature, and properly undertaken with antiseptic precautions, and they would not then have the terrible results they sometimes did, and which he thought they were inclined to minimise.

Dr. VACHER (Cheshire C.C.) then read the following paper:—

Dr. VACHER said: In taking part in this discussion on vaccination I propose to deal with the subject from the point of view of a public vaccinator. Though no longer holding this position, I have had some years experience as a vaccinator at a public station, and have, therefore, some knowledge of the system adopted in this country for obtaining the efficient vaccination of as many as possible. I have had opportunities of judging how this system works—wherein it is strong, wherein it is weak—and am prepared to make a few suggestions for its amendment. In many respects the system is altogether admirable. Registration is compulsory,

and the district registrar delivers to everyone registering a birth a printed notice informing him that the infant just registered must be vaccinated, and that free vaccination is offered at the place, and on the days named. Then, as the infant attains the age of three months, the vaccination officer sends a notice to the parent or guardian of the infant, intimating that "time is up," and if this notice is not attended to proceedings to enforce it are taken. This works very well, and in a district (as in the one I served) having an active vaccination officer, very nearly all the children born were accounted for. Roughly speaking about 9 per cent. died unvaccinated at three months old or under, about 2 per cent. were postponed on account of illness, and about 2 per cent. removed or could not be found. In respect of the remainder certificates were received that they had been vaccinated. Thus it is reasonable to infer that in an ordinary urban district, where there is no open hostility to vaccination, and where anti-vaccination zealots are few, nearly all infants who survive three months, and who are strong and well, are vaccinated. I think it may also be said that those vaccinated at public stations are nearly all efficiently vaccinated. The vaccination officer is paid by results, and gathers in the infants promptly; and owing partly, no doubt, to the inspection of vaccination undertaken by the Local Government Board and the gratuities given for good vaccination, at the vaccination stations a high standard of excellence has been reached and is maintained. However, competing with public vaccinators are general practitioners, especially those in poor localities, who minister to the wants of the sick poor in so-called private dispensaries. It is not beyond the truth to say that many of these are lukewarm on the subject of vaccination, and do not sufficiently realise the increased protection afforded by good marks, and thus assent to the request of mothers that lymph shall be inserted at one point only. Now, as the public vaccinator is enjoined, when operating, to insert the lymph in four places, and try and obtain four good marks, it is not surprising that many mothers turn from him to his more complaisant neighbour. Thus, notwithstanding the Government provision made for good vaccination, and that in a locality not disaffected nearly all infants are vaccinated, there is always a percentage, great or small, so imperfectly vaccinated that the protection given is feeble and uncertain, and disappears altogether in a year or two. How is this to be remedied? Simply by altering the form of certificate required to be sent to the vaccination officer, and the form of certificate which may be demanded by those in charge of the infant after its vaccination. Instead of requiring the operator to certify in exactly the same words whether the infant has one poor mark or four good ones, each certificate should state the number and quality of the cicatrices resulting. Of course, it would be needful to make a corresponding alteration in the law, and require revaccination in the case of all who had not, say, three good marks, or an area of foveated scar equal to half an inch square. This revaccination should be ordered on or before the seventh year. It would be easy to enforce it now that school attendance is compulsory. If the law were being altered it might be worth while to consider the expediency of ordering revaccination in every case soon after puberty. At present, from a public vaccinator's point of view, not much is done to encourage revaccination. He is only allowed half the ordinary fees if the operation is successful, and, of course, nothing when unsuccessful. As it is usual in revaccination for 50 per cent. or more to fail, these are rather hard terms, especially as when small-pox is epidemic and revaccination recommended, the public vaccinator has often to attend daily instead of weekly at his stations. Then, even when small-pox appears in a common lodging-house or a public institution, no one has power to require the inmates to be revaccinated. Happily, the active opposition of the mothers to all attempts to produce four marks has considerably abated. When the "four marks order" was new the protests were loud, and many who had hitherto brought their infants to the stations patronised private dispensaries.

What is still, and perhaps always has been, a constant anxiety to many vaccinators is the dread of using a syphilistic vaccinifer. It might be thought that as the operator has a roomful to select from there must always be a few syphilitically healthy infants, and no reasonable ground for fear. However, as a matter of fact, there are holidays and very wet days when the choice of vaccinifers is very limited; it often happens also that a mother asks for her infant to be vaccinated from some particular baby, and such preferences cannot be ignored without good reason. The real difficulty is that the infants are so swathed in garments that the operator cannot confidently judge of their freedom from the dreaded disease. The rule should be that no vaccinifer should be used as a source of lymph till the vaccinator has seen it stripped. For the convenience of the mother when stripping her infant a warm corner of the station might be screened off easily. At present a vaccinator has no power to require an infant to be stripped, and the mothers know it.

Next, as regards the supply of animal vaccine. It is doubtless a great advantage that there is an animal vaccine establishment for the vaccination of calves from which the National Vaccine Establishment can draw fresh supplies of calf lymph for distribution as required. Still something more than this is needed. Granting the advantage, safety, and security of animal vaccination direct from the calf, should there not be a station for every important town in the kingdom? Any mother can now demand that her infant be vaccinated with animal lymph, and the results of direct vaccination are so much more certain and satisfactory, facilities for direct calf vaccination should be given. The cost of maintaining such stations would not be great, as the time each calf need be kept is but three weeks, and it would not decrease in value during its detention.

The risk of vaccino-syphilis is got rid of absolutely by using calf lymph. The question next suggested is, "Is there any risk of vaccino-tuberculosis?" Doubtless the risk is not great; still it exists, and this cannot be certainly eliminated as long as human or bovine vaccinifers are made use of as a source of lymph. All possibility of the lymph being tainted from tubercle may be got rid of by vaccinating the goat, and from it the human subject. Valentine and others long ago proved that it was possible to do this, and one rather wonders why neither in England, nor on the Continent, nor in America goat vaccinifers have been used. It may be argued that this neglect of the goat is *primâ facie* evidence that there is good ground for not using it for the cultivation of lymph. I hope shortly to be able to lay before you some results on this subject It is obviously a matter which can only be determined by experiment, and an opportunity for experimenting has just been provided me. To sum up, then, I would have: (1) The fact of vaccination certified according to results, and revaccination compulsory when primary vaccination is inadequate to protect even for a few years; (2) power for the public vaccinator to require the stripping of infants it is proposed to vaccinate from; (3) animal vaccine establishments in all the large urban districts; and (4) an effort made to utilise for the cultivation of vaccine some animal not susceptible to tuberculosis.

Dr. WILLOUGHBY then read the following paper:—

Dr. WILLOUGHBY remarked that Mr. Vacher had anticipated him on the question of certification under Schedule C He had long ago urged such a modification of that form as should distinguish between efficient and sham vaccination as performed by unscrupulous practitioners, and which tended to discredit vaccination itself by providing its opponents with numerous and sometimes fatal cases of small-pox in persons alleged to have been vaccinated. Believing that the permanency or duration of the protection afforded by vaccination varies as the aggregate area of the vesicles, or, he would rather say, as their number, he maintained tha

nothing less than three good vesicles should be deemed technically "successful vaccination," and he would have the schedule read, "Successfully vaccinated in [so many] out of [such a number] insertions," with the addition in bold type of the note: "N.B.—The insertions must be at least four in number, and if the vesicles be fewer than three the child must be brought again for vaccination within three years." One might ask, as Hotspur did Glendower, "But will they come when you do call for them?" Perhaps not in a large number of instances, but it would tend to undermine the pleasant but perilous delusion that one place is as good as a dozen, and enable medical men to beat up their private patients who believe in vaccination, but defer revaccination in such cases to a more convenient season, that is to say, when small-pox is at the door. Then, though he would not assert that a full qualification in medicine, surgery, and midwifery was necessary, or that laymen could not be, as in India, efficient vaccinators, he could not see why the operator should not be required to identify himself by stating address and qualifications, as in all other certificates. It was easy for an unqualified assistant at some sixpenny dispensary to forget to efface the words "Registered practitioner duly qualified," and who could then say that the unknown Tom Smith or John Williams was not one of the eminent medical men answering to those not uncommon names? Thirdly, there was Schedule B, which he considered a disgrace to the responsible authorities, which he never had and never would sign. Some years ago Dr. Cory stated that he had vaccinated 15,000 infants without finding one really insusceptible, yet there were men who certified a considerable proportion of their cases as such. As a private practitioner he never vaccinated from arm to arm, always using tubes of his own filling, but it was extremely rare for him to fail in even a single insertion, and his only complete failures for many years had been with Government calf lymph on points. He would suggest that all cases of alleged insusceptibility be referred for verification to some public vaccinator, for at present there was nothing to prevent a man, with the connivance of the parents, from going through the form of vaccination with infinitesimally diluted lymph or even pure water, and after the third operation certifying to the insusceptibility of the child. Lastly, we wanted not only compulsory vaccination in infancy, but compulsory revaccination at puberty, as in Germany; the former protected during childhood, and generally modified an attack at any subsequent age, but the double operation alone gave the highest possible degree of immunity. This had been conclusively proved by the experience of Germany during the last twenty years, and as the facts were imperfectly known, he would recapitulate them as briefly as he could. Prior to the great war of 1870-71, the Germans were, like ourselves, a fairly vaccinated people, except that on the one hand the operation being required to be done within the first twelve, instead of three months, evasion by removal was easier, and many escaped until reaching school age; while on the other, all men who underwent military service were revaccinated at about the age of twenty. Small-pox, however, introduced by the French prisoners, raged through the length and breadth of the Empire, sparing only the army and the veterans, the whole number of deaths among the German soldiers having been about 230, chiefly Poles, whereas over 23,320 of the French troops died of small-pox alone. But while Berlin, Hamburg, and all the large towns were decimated, Frankfurt and the Duchy of Nassau, though thousands of French prisoners were massed in the neighbourhood, escaped unscathed. The explanation was obvious. There, and there alone, for the preceding five-and-thirty years had revaccination on leaving school, *i.e.*, in the thirteenth year, been compulsory; and one of the first acts of the new Imperial Parliament was to extend the Frankfurt law to the whole empire. What had been the result? First, that from that time, though every European country and capital had had its regular recurrence of epidemics, and the deaths in Prague and Vienna, German cities, though out of Germany, had been as high as 600 or 900 in a single year; those in any town in Germany could be counted in units. Nay more, careful analysis and investigation of all cases notified had proved that for the last ten years they had, without exception, been directly or indirectly of foreign origin. The majority were aliens, recently arrived from the adjacent and ill-vaccinated countries, Russia, Austria, Italy, and France, especially Russian or Polish Jews, Italian labourers, Bohemian servants, etc. Others were Germans, who, born before 1860, and therefore not coming under the Act of 1874, contracted the infection while travelling on business to Warsaw, Vienna, Paris, etc., and to these were to be added others of the same class, as well as unvaccinated infants who contributed the secondary cases, the primary case or infection having been invariably imported from abroad; and the grand total never exceeding two figures in a population of over forty-five millions. *Verbum sap.* But he did not believe in the abolition of compulsion, doubting whether, but for the fines, the majority of parents would trouble themselves even to register the births of their children.

Dr. LITTLEJOHN (Sheffield) referred to what had been said in support of voluntary as opposed to compulsory vaccination, and strongly deprecated any attempt to abolish compulsion. He thought the public needed educating in the matter, and compulsion was the way to educate them. They had never had a proper opportunity of proving their case; if they had, they could prove it up to the hilt.

Dr. DAVIES (Plumstead) desired to add his opinion in favour of compulsory vaccination. It seemed to him very dangerous for medical men to take up the rather weak position, that because there was so much opposition to vaccination they must give way, if only for a time.

Dr. HAUGHTON had listened with great interest to Dr. Seaton. He thought that perhaps he (Dr. Seaton) appreciated better than most members present the force of public feeling on this subject. That feeling at all events existed, and he did not think it was so unintelligent as some gentlemen had seemed to think. There was one argument that weighed a great deal with those who thought on this subject, and that was that there was no correspondence between the diminution in the small-pox death-rate and the diminution in the general death-rate—sometimes, indeed, where there had been a marked and decided decrease in the small-pox death-rate, there had been a decided increase in the general death-rate. Referring to the animal vaccine station in Lamb's Conduit Street, Dr. Haughton said, if his memory served him correctly, he believed the cost per individual vaccinated there was £5 in place of 1s. 6d. If they divided the number of persons vaccinated with the cost of the institution, they would find it amounted to about that; that was because so few people applied there for animal vaccination. People, he continued, were informing themselves so well on the subject that he would recommend the members of the medical profession to work themselves up a little better in it than they were at present, or they would find the laity were even better informed than they were.

Dr. WIGHTWICK desired to explain that he was not opposed to compulsory vaccination if it was really compulsory—if they could carry it out, as, for instance, it was in Germany.

The PRESIDENT said his experience agreed very much with Dr. Vacher's, and he also endorsed what had been said as to the operation being considered a serious one; or if not serious, as the public generally regarded that word, then as an important one which ought to be undertaken with proper antiseptic precautions. With regard to compulsion, he thought they could not at present afford to do without it; and he emphasized strongly a remark made by Dr. Willoughby that revaccination should also be compulsory. He was also of opinion that the certificates of successful vaccinations should specify the number and area of well-marked cicatrices.

Dr. SEATON, in reply, stated that he was very glad to have heard the opinion expressed by the President on the subject of compulsion. Coming as it did from the President of that society, it would no doubt carry very great weight. They would, however, remember that in his opening observations he had very carefully kept free from the subject the Royal Commission had to decide. He took it that they might have discussed the subject outside the question of compulsion. He did not think it was a matter for discussion at that meeting. He was afraid if they were to discuss that question, and Dr. Haughton gave them the pleasure of his company they would have to extend the discussion over a great many evenings. With regard to the question of the seriousness (in the sense of importance) of the operation raised by Dr. Wightwick, he was glad to know that at the present time a great deal more attention was given to the subject of vaccination in the medical schools than heretofore. Referring to the question of revaccination, Dr. Seaton read the following extract from the article from which he had already quoted in his opening speech: "While adhering generally to the recommendations of Dr. Seaton respecting 'revaccination at puberty' as a practice, the present writer (Dr. Edward Seaton) would draw attention to the very important effects produced in this country by able sanitary administration, combined with the 'systematic notification of infectious diseases.' By the help of this system, which is now generally adopted by sanitary authorities throughout Great Britain, it should be easy, as the present writer knows from experience, for sanitary authorities to prevent the spread of small-pox. Always assuming our present system of compulsory vaccination to be maintained, spread of small-pox may be checked by isolation of the sick in hospitals, and by freely offering opportunities for revaccination of the best kind when and where it is most needed. Under these conditions revaccination, as a practice, may be safely left to the age of puberty, the sanitary authorities being relied upon to give special warning of danger from small-pox to persons concerned. The period of puberty is, on the whole, most suitable for revaccination, inasmuch as at later periods of life loss of valuable time may sometimes be entailed by the sore arm which occasionally follows the operation." Dr. Seaton thought with Dr. Littlejohn that compulsion was no doubt one of the means of education in this subject, and was a means which ought never to be lost sight of. He would again remind them that he had not led the discussion in the direction as to whether compulsion was desirable or not.

PROCEEDINGS OF THE WEST OF ENGLAND AND SOUTH WALES BRANCH OF THE INCORPORATED SOCIETY OF MEDICAL OFFICERS OF HEALTH.

A MEETING of the above branch was held at the offices of the Sanitary Authority, Prince Street, Bristol, on January 11th. Present: Drs. D. S. Davies, E. Davies, Bond, Brabazon, Heaven, Parry, Crossman, and Dowson, and Messrs. F. W. Stoddart, and J. Cooke Hurle.

After the confirmation of the minutes of the last meeting, Dr. Walter Dowson, D P.H., of Bristol, was duly elected a member of the branch, and Mr. Joseph Larke Wheatley, Town Clerk of Cardiff, was elected an associate. Dr. J. T. Hyatt, Shepton Mallet, proposed, and Dr. Brabazon seconded the name of Dr. Frederick Stockwell, M.O.H. Wincanton Rural S.A, as a Fellow.

The next item on the agenda was a resolution to be proposed by Dr. Sheen, of Cardiff, "That the bye-law, fixing the branch subscription at 3s. 6d. per annum, be altered ro read 2s. 6d." In the absence of Dr. Sheen, the resolution was moved by Dr. Crossman, in order that the opinion of the meeting might be taken on the matter. Dr. Parry was the seconder. The President-elect requested the treasurer to inform the meeting as to the financial position of the branch, and the probable expenditure during the present year; after hearing the statement Dr. Brabazon moved as an amendment, "That it is not expedient to make any alteration in the subscription for this year." This amendment was duly seconded, put to the meeting, and carried.

Dr. BRABAZON, Bath, then put a few points before the meeting, with reference to the words, "nuisance or injurious to health." Was the word "or" entirely disjunctive? If so, then it seemed to be the duty of the medical officer to advise his authority to take action for common nuisances whether affecting health or not. He instanced a case where great pressure was brought to bear to induce him to condemn, as a nuisance to be dealt with by the authority, a collection of matter, which, though occasionally offensive, could not be said to

be injurious to health. He would be glad to hear the views of members on the question.

A discussion followed, in which Mr. J. Cooke Hurle, Dr. Bond, Dr. E. Davies, and others took part.

Dr. Bond mentioned the case where the word "or" was decided to mean "and." Since then many cases had been decided that "nuisance or" is correct. He thought, however, that for a sanitary authority to take action the nuisance should be one which affects the public health, though it may not be absolutely "injurious." It would be sufficient for the thing complained of to be a possible source of danger, and many nuisances were constantly dealt with which, though not at the time absolutely injurious to health, were still contingent sources of danger. He thought it was the duty of the authority to take cognizance of, and deal with, all matters affecting the comfort of the public, but he was not sure that it was their duty to do so when it was only the comfort of the individual which was affected.

Dr. D. S. Davies was of opinion that such slight nuisances as burning coke, decaying vegetable matters, etc., which may affect comfort, and to some extent health, by leading to taste in the mouth, loss of appetite, etc., should be dealt with, although not producing definite disease. Some of the matters which authorities were asked to deal with were quite beyond their powers, as when gravely requested to prevent noise from persons turning out of publics, or, as in one case where a third illegitimate child had been born in a house, and the authority was asked to prevent a repetition of such an occurrence.

Dr. E. Davies remarked that evidently it was not necessary that a nuisance should be "injurious" before action was taken, because it is penal to keep any swine or pigstye in any dwelling house (in an urban district) "so as to be a nuisance to any person."

Dr. Brabazon thanked the members for their expression of opinion, and would be inclined to take a less restricted view of the matter in future. He further said he should be glad to see the word "dangerous" substituted for "injurious" (as in the London Public Health Act), as clearing the ground considerably.

By consent of those present, Mr. F. W. Stoddart's paper on "Some Points in Water Analysis" was deferred till the next meeting, in order that discussion might not be curtailed. After deciding that the next meeting should be at Cardiff on the first Thursday in April at three p.m., the meeting terminated.

Copies of Transactions of Society of Medical Officers of Health for 1886-7 will be purchased by Dr. Wightwick, Hon. Sec. (to whom communications on the subject should be addressed), for full price.

PROCEEDINGS OF THE NORTH-WESTERN BRANCH OF THE INCORPORATED SOCIETY OF MEDICAL OFFICERS OF HEALTH.

The ordinary meeting of this branch was held at the rooms of the Chemical Club, Manchester, on Friday, February 9th, at four p.m. Present: Drs. Paget (president), Adams, Anderson, Armitage, J. Barr, Edlin, Etches, Gornall, Hannah, Niven, Park, Porter, Sidebotham, Vacher, and Wheatley.

A letter was read from Dr. Sergeant, regretting his inability to be present, and enclosing some printed slips of his "Notes on the Isolation Hospitals Act, 1893," which were distributed among the members.

A letter was read from the hon. secretary of the Birmingham and Midland Branch, stating that "at the last meeting of the council of this branch it was unanimously resolved that, in the opinion of this council, the relation of the branches to the society as a whole calls for reconsideration, and that a sub-committee be appointed to invite the views of the other branch councils on the question." In forwarding this resolution the writer was "empowered to suggest that a meeting of such sub-committee might be held in a central place, and the points which call for consideration discussed in detail."

The Hon. Secretary said he thought it better to submit this letter from the Birmingham and Midland Branch at an ordinary meeting of the North-Western Branch, though it appeared to be addressed to the council.

It was proposed by Dr. Gornall, and seconded by Dr. Armitage, that the formation of a sub-committee for the purpose suggested be approved of, and that the president, treasurer, and hon. secretary be appointed as delegates to act on the said sub-committee.

This was agreed to unanimously.

The President then briefly drew attention to the recent distinction gained by two members and past presidents of the branch. Since the last monthly meeting of the branch two important appointments had been made. Medical officers of health had been appointed for Liverpool and Manchester. The gentlemen elected, Dr. Hope and Dr. Niven, were well known to the profession. Their work had placed them where they ought to be. All would congratulate them, and the branch was to be congratulated on having them as members. The President then called upon Dr. Anderson to open the discussion on

The Administration of Small Infectious Diseases Hospitals.

By A. Jasper Anderson, M.A., M.B., M.O.H. Blackpool.

My object is to bring prominently a few subjects to the front for thorough discussion. The subject is one of very great practical importance to all

medical officers of health, and any information which will lead to the better management of such institutions will I am sure be gratefully received by myself and others. I wish to distinguish between the large hospitals with a trained resident staff, and those which are not of sufficient size to admit of the employment of a resident medical officer; and it is to these latter that I limit my remarks. In such hospitals a thoroughly trustworthy person should be appointed as matron. The whole success of such a hospital as a means of isolation depends upon the resident in charge having tact and being able to maintain proper discipline, to see that the prescribed duties and regulations are properly carried out, and to report faithfully every occurrence to the visiting medical man placed in charge. To get such a person a higher salary than £30 per annum must be offered.

Who is to treat medically the patients admitted to the hospital? *A priori*, one would say certainly the medical practitioner in attendance before admission. But, in practice, it does not work out well. If there are many cases in the hospital there are probably nearly as many medical men coming to the hospital at all periods of the day, and taking the matron off from her duties. These lead to frequent visits to the wards, to increased chances of conveying infection, and to great disparity in the views taken as to the rigour with which disinfection requires to be carried out. *Tot homines quot sententiæ?* How are patients to be treated together if diverse views are held as to the amount of ventilation or warmth required in the ward? Further, is there not great risk in general medical practitioners attending patients in such hospitals? I maintain that the medical officer of health for the district should attend all cases in these institutions. He should be definitely appointed medical superintendent. He would thus take an interest in its working, and become more thoroughly acquainted with its shortcomings and those of its staff, than he would be if he merely went down at periodical intervals to make an inspection for himself, and to inquire into the numerous complaints which he would no doubt receive and have to deal with. I would not absolutely prevent any other medical man visiting the patient, but would have it most distinctly understood that the medical officer of health as medical superintendent had charge of the patient, and that anyone else be called in consultation as he or the patient's relations thought fit. The objection will be raised to this arrangement that it would not work if the medical officer of health were in private practice. This is true; and my remarks only apply to the steadily increasing number of cases in which the medical officer of health is excluded from private practice.

From inquiries as to other towns, mostly chosen because they are to some extent analogous to Blackpool, I found that in 14 towns or districts with medical officers of health devoting their whole time to the duties of the office, he had been appointed medical superintendent in 12, whilst the other two had hospitals with resident medical superintendents. Of the 14 districts with a medical officer of health in practice, that official had been appointed medical superintendent in eight, not so in five, whilst in one there was a medical superintendent appointed. The question, "Do medical practitioners in the town continue their attendance upon patients after the latters' removal to the hospital?" was answered variously in the eight cases where the medical officer of health had been appointed medical superintendent: (1) In many cases; (2) yes, if desired; (3) in some cases; (4) no; (5) if they please; (6) it is allowed, but very seldom taken advantage of; (7) yes, sometimes; (8) yes, if they so desire.

The visits of clergymen and ministers within the wards I restricted to those producing a written order from the medical attendant or myself. But here I met with a difficulty from the Roman Catholic priests. They were perfectly willing to carry out all measures of disinfection, but distinctly refused to allow myself or any third party to stand between them and the "soul" of any member of their flock.

The admission of patients is a difficulty where the medical attendant follows his case into the hospital and resents the slightest examination of the patient on the part of the medical officer of health. It appears to me that in a hospital belonging to a sanitary authority the cases are in the charge of the authority, and that if any other disease is contracted whilst there an action for damages might lie against the authority. Supposing, then, that a case of scarlet fever is certified as measles, and on the strength of the certificate is admitted to a ward with measles patients in it, and some of these take the disease, and it perhaps proves fatal, could the authority successfully defend an action?

The greatest difficulty arises with regard to the question of the discharge of patients, and especially after scarlet fever. Opinions are very diverse as to the period of infectivity of scarlet fever. I have always insisted upon the power of vetoing the discharge of a patient if in my opinion it was still infectious. One case I met with was that of a medical man who first insisted and then implored me not to prevent a patient being sent out of the hospital about three or four weeks after the onset of scarlet fever, desquamation having entirely ceased. I said that I must closely examine the case first, and then found the legs peeling in profuse scales. Visitors should be allowed, but precautions taken to prevent any risk of infection. This is done by steps allowing them to look through certain windows of the hospital. In cases of urgent necessity a near relative may visit a patient within the ward on the production of a written order.

Other points of detail in administration were then discussed by Dr. Anderson, including the

training of nurses, the treatment of single cases, the provisions, and methods of book-keeping in an infectious hospital.

A laundry-maid will be required. A porter should be engaged who is a single man, and to perform the duties cited in the regulations. As far as possible every member of the staff should live and sleep on the premises, so as to give as little communication with the outer world as possible.

Notes of Infectious Hospital Management.

By G. W. Sidebotham, M.R.C.S.,
M.O.H. to the Hyde District, Stockport Union.

For many years we have had a hospital at Hyde, which to a great extent corresponds with one of the district hospitals to be provided by the County Council under the new Act, but with this great advantage (from our point of view), that we have the sole control of the hospital situated in our district. Although from time to time we have been approached by neighbouring bodies with a view to amalgamation, we have always so far considered it best to retain full control, but at the same time to grant facilities to our neighbours in respect of accommodating their infectious cases so long as we had room. Firstly, because it is always pleasant to do a good turn to one's neighbour; secondly, by helping to support infectious diseases near our frontier we obviously lessen the risk of its spreading to ourselves; and thirdly, we are thereby enabled to diminish the cost of maintenance of the establishment. And when you consider the great initial cost of land and buildings, as well as annual expenditure, you will I think agree that the plan works well for both parties to the bargain, saving *them* the initial cost and *ourselves* part of maintenance.

At Hyde we were fortunate in overcoming the initial difficulty of site. A piece of land in exactly the right place came into the market and no serious opposition was raised to its purchase. A good road to it, a good distance from any other buildings, sufficient area to be able to place the building, not only a full hundred yards from the road, but also a good distance from any of the boundary walls, and a large area for sewage disposal and treatment, were all points in our favour.

Unfortunately, the matter rested with the acquisition of a site until an epidemic of small-pox broke out; then, instead of erecting a permanent building, a second-hand wooden hut hospital was bought. With such a building the danger of fire and the difficulty of warming are great, the appearance is not good, and decay proceeds apace, not to mention, among other minor matters, difficulties with the Local Government Board on the question of borrowing money.

The kind of buildings most suited to hospitals of this type is undoubtedly the one-story brick pavilion with comparatively small wards opening out on to a glass-covered verandah. Each pavilion should be arranged to accommodate one disease only, and there should be a very distinct space between them. At Hyde there has never been a single instance of spread of infection from one pavilion to another, although often three diseases are under treatment at the same time.

I have adopted the plan of keeping one ward, when possible, for quarantine purposes, or for the reception of doubtful cases until the diagnosis is settled. I have had two cases of measles sent in as small-pox and several cases of chicken-pox, but by means of the quarantine ward no harm was done to anybody. It is a great relief to medical men to know that doubtful cases can be sent in with perfect safety, while at the same time the value of the hospital as a means of stamping out infectious disease in its infancy is enhanced.

In laying out the grounds a high boundary wall must be built and a lodge at the entrance in which should live a lodge-keeper and his wife, one of whom must be always about.

Sewage Disposal.—Earth closets are used at Hyde, and slop water, bath water, etc., is conducted to settling tanks and disinfected, and then allowed to percolate through porous earth on a separate piece of ground outside the boundary of the hospital land kept for this purpose, and fenced off. When the tanks are full, the contents mixed with coke are burnt on the said separate piece of land, on a day when the wind does not send any fumes over the hospital.

Dr. Sidebotham proceeded to discuss the ambulance and other arrangements. He was of opinion that as a rule the medical officer of health should attend cases in the hospital. Visiting of patients ought to be discouraged, patients being allowed to see their friends only through the windows, except in cases in which a fatal result is anticipated. In fatal cases the body should never be allowed to be taken home. Thorough disinfection of clothing and of the person was an essential preliminary to discharge of a patient. The medical officer of health should have full powers as medical superintendent. The duties and relation of the other members of the staff should be clearly defined. It had been found a bad plan to have a married matron and her husband in charge. It was important that the matron and nurses should have the art of endearing themselves to the patients, so as to remove all difficulties in persuading mothers to allow their children to come into the hospital.

Such a comparatively small hospital as that at Hyde for a widely scattered district might possibly be inadequate in the event of a large epidemic, but their experience hitherto, especially as regards small-pox, had been that the hospital was successful in preventing such an outbreak. If necessary, the accommodation might be supplemented by the provision of hospital marquees.

The Administration of Small Fever Hospitals.

By Charles Porter, M.D., M.O.H. for Stockport.

I propose briefly to refer to those points which in my personal experience required special consideration:—

1. The *effectual separation of the different kinds of infectious disease* is often a matter of great difficulty in small isolation hospitals. In Stockport we have only two pavilions; each of these has three wards in direct aerial communication. During the early months of 1893, the northern pavilion was occupied with small-pox, and by stress of circumstances it became necessary to place typhoid, scarlet fever, and even I believe on one occasion, diphtheria as well, in wards of the southern pavilion. The result was that, almost without exception, every case of typhoid that was brought in for treatment contracted scarlet fever, while a little girl admitted very ill with diphtheria subsequently developed scarlet fever, and finally an attack of small-pox (the latter owing to the structural defect in the hospital, referred to at a previous meeting of this Society). Eventually, I distinctly refused to accept responsibility for the safety of patients admitted under such circumstances, and at present only two sorts of infectious disease are received for treatment.

This very unsatisfactory condition of affairs can, of course, only be dealt with effectually by the erection of another pavilion, but pending the adoption of my recommendation to that effect, I have suggested that in one of our two existing pavilions, the doors by which its three constituent wards open into a common hall should be temporarily built up, and a new entrance into each ward made from outside the building. Another difficulty in dealing with different kinds of infectious disease in a small hospital is the provision of separate nursing and ward attendance, which is essential if isolation is to be properly carried out. As at present, however, only two kinds of disease are received for treatment at any one time in the Stockport Fever Hospital, this trouble does not arise.

2. *The Question of Staff.*—The Stockport Isolation Hospital has regulation cubic capacity for twenty-eight beds. At least double that number of patients have, however, been received at the same time during the past summer, the covered corridors being used as convalescent wards. My great difficulty in obtaining an adequate staff of trained nurses has been the two-fold one of convincing those to whom I am responsible, that the chances of recovery of patients are greatly lessened by the employment as nurses of ignorant untrained women, generally totally wanting in accurate and prompt obedience, the first essential of a nurse; secondly, of obtaining credence for the assertion that however competent and willing nurses may be, it is unreasonable to expect them to go on working indefinitely without proper periods for sleep and outdoor exercise, and that if nurses are to continue to discharge their onerous duties satisfactorily and well, it is imperatively necessary that they should have for the purposes of sleep eight uninterrupted hours, away from the vitiated air of the wards, and at least one hour's open-air exercise during the twenty-four.

The question of efficient night nursing is one to which too little attention is often paid, although unremitting care at night often makes all the difference between recovery and death. It is sometimes found practicable for the nurse to take the day, and the probationer the night work in each pavillion. Sometimes the necessity for extra help in one pavilion arises when the cases in the other are so few and slight that the charge nurse alone can with ease tend them by day, and at night sleeps in her room in the pavilion, no regular night-nursing being necessary. On these occasions her probationer is disinfected, and temporarily transferred for night-work to the other pavilion. At other times, of course, an extra trained nurse must be procured, and in an emergency the services of a respectable woman who lives near the hospital have been availed of for a night or two. Where there is a difficulty in providing special night nurses I think the plan adopted in the extension of the fever hospital at Dover—viz., the provision close to the head of each bed of a button, upon pressing which a bell rings loudly in the nurse's room—is an excellent one.

The provision of proper uniforms costs only about 35s. per nurse per year, and adds greatly to tidiness of appearance, in addition to the hygienic advantage attending the use of cotton overalls in an infected atmosphere.

3. *Relation of the Medical Officer to the Hospital Staff.*—For the efficient working of the hospital, it is essential that the medical officer have full control and power of dismissal of those who have to carry out his directions. I mention this specially, as in a recent advertisement for a medical officer of health and physician to the borough fever hospital I was surprised to observe the announcement that "the gentleman appointed will have no power to suspend or dismiss any nurse or other subordinate official." Surely, if corporations desire their establishments to be worked satisfactorily, it is high time that they extended to the responsible officials at the head of such institutions the power possessed by the manager of every well-regulated business concern.

4. *Patients' Diet.*—This is an important matter, which should be regulated by a dietary drawn up by the medical officer himself. I also think that all food should be contracted for direct by the corporation, and that it is not wise to farm out the food-supply to the master and matron, as is done at Stockport, at the daily rate of 6d., 8d., and 9d. per head for children, according to age, rs. for

patients and servants, and 1s. 3d. for other members of staff. It appears to me that in the hands of unprincipled persons this arrangement would be open to grave abuse.

5. *Complaints by Patients.*—To ensure as far as possible the well-being and comfort of all patients, I have had the following notice printed in large type, framed and exhibited in each ward, and every complaint made is instantly investigated: "Any patient who has any complaint to make with regard to nursing, food, or any other matter relating to his or her comfort, is specially requested to state fully the nature of such complaint to the medical superintendent on the occasion of his next visit to the ward."

6. The ventilation and heating of wards has been a cause of anxiety in cold weather. It has been almost impossible to keep the temperature equably between 55° and 60° without closing the windows and ventilators to an undesirable extent. Unfortunately, we are not provided with any of those forms of fireplaces by which entering air is heated. Our heating resources consist of a very good system of hot-water pipes, in addition to a fire in each ward. The necessity of having these hot-water pipes covered in or railed off in some way was recently made apparent to me, as a child who sat upon them burnt her buttocks rather extensively in the second degree.

7. The careful regulation of visiting of patients and of advising their friends as to their condition are points which merit consideration. For my own convenience I have adapted from various forms in use in metropolitan and provincial hospitals the following:—

(1) Notification of patient's admission and present condition, with directions for obtaining information as to progress, and an intimation that prompt notice will be sent of any serious change.
(2) Notification of serious change in patient's condition.
(3) Copy of visiting regulations.
(4) Visitor's admission card.
(5) Notification of time of patient's discharge.

To minimise the trouble of replying to the inquiries of friends, a form with the subjoined headings is posted up at the sanitary office:—

CONDITION OF PATIENTS IN THE ISOLATION HOSPITAL.

Week ending..... 189...

NAMES.	Progressing satisfactorily.						Some improvement.						No improvement.						Worse.					
	M.	T.	W.	T.	F.	S.	M.	T.	W.	T.	F.	S.	M.	T.	W.	T.	F.	S.	M.	T.	W.	T.	F.	S.

The condition of each patient is telephoned from the hospital in the morning and indicated by a stroke opposite the sufferer's name under the heading by which it is described. This sheet is open to the inspection of patients' friends between half-past eight a.m. and half-past five p.m.

Visitors are allowed to see their friends through the windows only. No non-vaccinated individual or un-revaccinated adult is allowed, under any pretext whatever, to enter the small-pox pavilion.

8. The means of restraint of violent delirious patients is often a difficult matter. It is most essential that there should be a high iron fence all round the hospital grounds.

9. *Discharge of Convalescent Patients.*—If isolation is not to be robbed of half its value, it is absolutely necessary that patients should leave behind them in the wards their infected clothing, and have their final bath in some separate building kept specially for the purpose. In Stockport we are admirably equipped in this respect as there are well adapted baths and discharging rooms in the building which contains the steam disinfector. Patients on leaving the discharging-room quit the hospital grounds without again entering the hospital, and this arrangement works very well. I think it well to refer to it, as in one small fever hospital I have seen patients actually bathed, and dressed in, and discharged from, the infected wards.

10. *Means of Disposal of Refuse.*—In Stockport till within the last fortnight we have had a system of earth closets which, especially in hot weather, constituted an objectionable nuisance, causing offensive smells to pervade the passages in the vicinity of each ward. These have recently been replaced by water-closets, except in the typhoid fever pavilion, about which I have hesitated, for though I am aware that the best authorities hold that thoroughly disinfected typhoid stools may with impunity be passed into a public sewer, the practical difficulty of securing their invariable disinfection has to be got over, for nurses are only human and cannot always be depended upon. At present we have no cremator, and typhoid excrement is most unsatisfactorily "put out of sight" by depositing it in a hole dug in stiff yellow boulder clay, and then covering it over.

The provision of small tin ashbins with tight-fitting lids to receive the refuse of each ward is, I think, very essential. This refuse is as far as possible burnt in the furnace of the disinfector, in the absence of a cremator.

11. All fissures in ward-floors should be filled to prevent collection of dirt therein, and the floors should be stained and polished. Since this has been done we have effected much saving of labour, and the hygienic advantages are well known.

12. The existence of verandahs (as in the new hospital at Wimbledon), on to which patients' beds can be wheeled from the wards in fine weather, is I think advantageous, especially in the treatment of small-pox.

13. The frequent disinfection of the blankets, mattresses, etc., used by patients while in hospital, is a matter which, though it frequently escapes attention, is important.

14. Telephonic communication between the hospital and the medical officer's house is highly desirable. It saves many an unnecessary journey, and enables timely directions to be given.

15. We are at present procuring light movable baths, with some block and pulley apparatus for easily lifting patients (*e.g.*, in typhoid for a graduated bath) into a bath alongside the bed.

16. Finally, the provision of fire extinguishing appparatus is most important. The staff, including the nurses, are occasionally drilled by the superintendent of the borough fire brigade. The hand-pump on wheels which forms parts of the fire apparatus is used for spraying the walls and ceilings of the wards with corrosive sublimate solution when disinfection is being carried out.

After a few words from Dr. NIVEN, in which he expressed the interest he took in the subject under discussion, and referred to the use of the hospital at Oldham, especially during the prevalence of small-pox, the PRESIDENT proposed the adjournment of the debate. This was seconded by Dr. HANNAH, and agreed to.

(End of Proceedings of the Incorporated Society of Medical Officers of Health.)

CREMATION AND CHOLERA.—On the advice of Dr. Walford, the Cardiff Port Sanitary Authority have erected a very complete crematorium for the disposal of bodies of persons dying of cholera, and for the destruction of infected excreta, bedding, etc.

THE PRESERVATION OF EGGS.—According to Zörkendörfer ("Ann. de Micrographie") there are two varieties of rotten eggs, one of which is greenish-black inside, and smells of sulphuretted hydrogen, while the other is ochre-coloured, and has the odour of human fœces. Many varieties of bacteria may be found, but those essential to the change are divisible into two groups, those which produce H_2S and those which form a green fluorescent pigment; both groups being aërobic. Experiments show that the egg-shell is but an imperfect protection against bacteria, especially if the atmosphere is damp. To preserve eggs they should be heated to 50° C. for a day or two, and then kept in a dry place, or, better still, coated with varnish.

Public Health.

THE ENLARGEMENT OF "PUBLIC HEALTH."

THE present number of PUBLIC HEALTH is larger by eight pages than any previous number, and it is proposed that the journal should continue to appear with this increased number of pages during eight months in each year.

The enlargement of PUBLIC HEALTH has been necessitated by the steadily increasing demand on its pages. The increase in the number of branches of the Incorporated Society of Medical Officers of Health, and, we may add, the fuller reports of the meetings of branches now received, would alone necessitate this enlargement of the official journal of the Society. It has been decided, moreover, that a portion of the grant obtained from the Berridge Trustees could not be better spent than in the enlargement and improvement of PUBLIC HEALTH, in the educational and other benefits connected with which each member of the Society would equally share. With this object in view the services of skilled contributors have been secured in special departments; and in future issues concise and accurate accounts of recent bacteriological and pathological investigations, of recent researches in every department of public health, including analytical work, as well as *précis* of French and German current hygienic literature, will be given.

This implies that the increased number of pages in each issue will scarcely suffice for the additional matter to be inserted. To meet this difficulty, we bespeak the kindly help of the secretaries of the branches and of all contributors of papers. The journal is not worked as a paying concern, but for the mutual instruction of the members of the Society. It is hoped, therefore, that contributors of papers will help the editor by striking out from their contributions all matter of merely ephemeral or local interest; and that the reports of discussions may be confined to points of general interest. The Editor receives a large number of marked newspapers. It is impracticable, without the aid of a large staff, to utilise these to the full extent; but if, instead of the newspapers, a short *précis* of the matter to which attention is directed were sent (omitting everything which is not of general interest), loss of valuable material might be avoided.

With the co-operation of every member of the parent Society and of its constituent branches, the value and mutual benefit of PUBLIC HEALTH to all engaged in the public health medical service may be still further increased; and the history of the Society in the past justifies us in expecting this.

THE BUDA-PESTH CONGRESS.—It will be seen from another column that it is intended that the

Incorporated Society of Medical Officers of Health should be well represented at the Eighth International Congress of Hygiene and Demography, which will be held at Buda-Pesth during the week commencing September 2nd. With a view to facilitating travelling and other arrangements, the Editor has communicated with the Rev. Dr. Lunn, whose skill and success in organising large continental parties is well known, and learns from him that the journey to Buda-Pesth and back, including second class railway fares, first class boat fares, and first class hotel accommodation on the journey and during the week at Buda-Pesth, can be managed approximately for twenty guineas. This includes all expenses for travelling and hotels during the nineteen days' absence from London. The writer can state, from personal experience of former trips organised by Dr. Lunn, that the arrangements were such as met the requirements of the most fastidious.

The itinerary will probably be as follows, though this (as well as the exact cost of the journey) is subject to slight revision when the numbers who will join the party are more accurately known :—

Monday, August 27th	Start from London.
Tuesday, August 28th	Sleep at Cologne.
Wednesday and Thursday, August 29th and 30th	Up the Rhine, sleeping at Maquerei and Strasburg(?)
Friday, August 31st	Sleep at Nurenberg.
Saturday, September 1st	Reach Buda-Pesth.
Saturday, September 8th.....	Leave Buda-Pesth for Vienna.
Sunday, Monday, and Tuesday, Sept. 9th, 10th, and 11th...	At Vienna.
Wednesday, September 12th	At Munich.
Thursday, September 13th ...	At Coblentz.
Friday, September 14th	At Brussels.
Saturday, September 15th ...	Arrive in London.

It is very desirable that those intending to form part of the above party should send an early intimation to the Editor of PUBLIC HEALTH, 11, Gloucester Place, Brighton. This will not finally commit those intending to come, but will enable approximate arrangements to be made to secure the minimum expense and the greatest comfort for the party.

THE DISPOSAL OF TOWN REFUSE.—A paper on this subject, by M. O. du Mesnil, may be found in the "Ann. d'Hyg. Publ. et de Méd. Légale" for December, 1893. It is stated that whereas 60,000 tonnes have to be destroyed annually from the City of London, and 197,000 at Glasgow, the quantity of refuse to be dealt with in the case of Paris amounted in 1892 to as much as 1,025,033 tonnes. Incineration by destructors, although successfully adopted in several of the British large towns and cities, is rejected by M. du Mesnil on the ground of expense and the difficulty in disposing of the product. He calculates that, whereas the present cost of removal to the fields is 1·85 fr. per tonne, it would cost 3·50 if destructors were adopted.

COST OF CHOLERA PRECAUTIONS—PAST AND FUTURE.*

By H. E. ARMSTRONG, D.Hy., M.O.H. to the River Tyne Port Sanitary Authority.

CONSEQUENT on the conference of port medical officers of health convened by the Lord Mayor of London in December, 1892, a printed copy of the report of which was forwarded to each member of the authority, a conference of port sanitary authorities was held at the Guildhall, London, on February 17th, 1893, at the instance of the Port of London Sanitary Authority, the Lord Mayor again presiding, when the following resolution, among others, was unanimously passed, viz., "That this conference is of opinion that, inasmuch as special cholera precautions carried out by the port sanitary authorities of the kingdom are for the benefit of the whole population, those precautions as far as they are special should be carried out at the Imperial expense." A second meeting of port sanitary authorities was held at the Westminster Palace Hotel in April, when a deputation was appointed of 17 members of Parliament present, to obtain for the port sanitary authorities an opportunity to urge the matter before the Chancellor of the Exchequer and the President of the Local Government Board. The result of the application of the port sanitary authorities was unsuccessful. At the interview in question, the list of items of "special and extraordinary expenses" for cholera purposes, which was asked for and supplied, did not make any reference to the important matter of disinfecting apparatus. This, exclusive of disinfectants—a heavy item in cholera times—is costing the Tyne Port Sanitary Authority close on £800. Seeing that the danger to the country from neglect of efficient disinfection of any case of cholera brought by a ship is the same in one place as in another, the appliances requisite in this respect for the Tyne are equally requisite for every other port in the kingdom, and altogether would cost about £40,000. But to most British ports an outlay of £700 or £800 for such a purpose is more than they can either afford or reasonably be expected to incur. They have, therefore, neither provided this most efficient means of protection, nor are they likely to do so, and the country is, through the state of unpreparedness of these ports, open to attack. Nor is this all. A large number of our ports are grossly deficient in regard of other measures of protection against cholera. This is abundantly shown by the returns prepared for the information of the Conference of Port Sanitary Authorities,† and also by an editorial in a recent issue of the *British Medical Journal*.‡ The

* From Dr. Armstrong's Annual Report for 1893.

† A summary of these returns showing statistics of the general unpreparedness of ports to meet the introduction of cholera was given in my paper on "Cholera Precautions," read at the meeting of the British Medical Association in Newcastle in August, 1893.—H. E. A.

‡ On "Port Cholera Expenses," January 13th, 1894.

latter being an exposition of opinions based on the practice instead of on the requirements of the authorities in question, is virtually an advocacy of principles, not of efficiency, but of economy. The article in question reflects the views of those who seek to maintain that port cholera expenses should not be paid out of the national exchequer, and is calculated te have considerable weight with readers not conversant with the subject, or who view it from one side only. The writer of the article, whatever his object may have been, has certainly succeeded in proving beyond dispute that very little has been done to protect this country from invasion by cholera through the only channels by which it can enter, viz., our seaports. Thus he shows :—

1. That the total abnormal (cholera) outlay in 1892 and 1893 is, on rateable value, "less than one penny in the pound. . . one farthing being enough in respect of 1893."
2. That the amount spent on disinfection was only £156.
3. That with respect to inspection, medical and non-medical, as many as forty districts have nothing to return under the heading of money spent ; and that there is "a notable amount of shipping within the harbours of authorities whose extra-inspectional expenditure has been *nil*."
4. That there is a "noteworthy difference between the cholera expenditure of 1892 and 1893 "—(viz., a deficiency of above 50 per cent. in the latter year.
5. That the above deficiency comes chiefly under the headings of Hospitals, Ambulance, Disinfection, Disinfecting Apparatus, and Inspection.

Notwithstanding his knowledge of the above facts, which are incontestable, the editor of the *British Medical Journal* asks, "Is it seriously considered necessary to press for State aid?" He seems to conclude that because little has been done there has been little to do. He fails to perceive one at least of the true indications of the noteworthy falling off of precautions in 1893, as compared with 1892, viz., that in some districts the authorities have actually carried out the threat uttered when the application for State aid last year was refused—that they would spend no more money in guarding the country, or words to that effect. His principal argument against such aid has no better basis than the palpable fallacy that the state of preparedness of all ports indiscriminately to resist the introduction of cholera by ship, is to be gauged by the amount of expenditure for sanitary purposes per pound levied on the rates of the different riparian authorities, irrespective of the number of these bodies or the rateable value of their districts. What would be said of such an idea seriously put forth as a criterion of the defences of our ports in time of war ?

After objecting as above to the claims of port sanitary authorities in general, on the ground that their expenditure has been little, the editor somewhat inconsistently opposes that of Grimsby because it is large !

He would entirely exclude "from any participation in aid from other than local rates" the three requisites of hospitals, ambulance, and disinfecting apparatus, on the assumption that the provision of these as for ordinary times will be sufficient to meet the extraordinary requirements of an outbreak of cholera. The idea is absurd, and could only have originated in the brain of a person utterly devoid of practical experience on the question. Take for example the River Tyne Port. The cases requiring admission to the Floating Hospital from all infectious diseases during the past twelve years have averaged about one only per month. On such a basis how small need be the accommodation and appliances of ambulance and disinfection ! Surely not worth the provision of a floating hospital of any kind when £80 or £100 a year would cover the expenses of maintenance of the cases, if treated in a hospital on shore. But the authority, knowing that past experience of ordinary infectious disease on shipboard is no guide to possibilities in respect of cholera, have wisely furnished their district with a hospital of thirty beds, so as to be ready in the event of a rush of cases, say by the same ship. Such an emergency may occur in any port, no matter how small, and in an extreme case may involve the accommodation of the entire number of persons on board the largest ship entering that port. Without going to the extent of providing for such a remote contingency as this, every port should have accommodation available for not less than eight or ten cases of cholera. But how can small ports be expected to provide hospitals and other appliances on this scale out of local rates ?

The editor twice asks, "Where is the line to be drawn ?" The question might with equal propriety be put in the case of war defences. Between a port authority keeping a microbic foreign enemy out of a country and a land authority protecting itself, there is little or no ground of comparison. There is, on the other hand, at least one important point of difference. An inland authority has in its local acts and the law of the land some degree of protection against the wilful introduction of infection into its district ; but a seaport has no such protection against the arrival of a cholera-stricken ship. After his final assertion that Imperial aid for abnormal cholera expenses should be refused altogether, the alternative proposed by the editor, viz, that the costs should be paid out of the county funds is in principle no whit different from the course he condemns. The expense of all measures of protection by which the nation benefits is, I maintain, justly payable out of the nation's taxes, of which ports pay their share. If ports appear to derive more immediate benefit from any such expenditure than inland towns, they are entitled to it from their greater exposure to danger and their greater responsibility.

The protection of the country from invasion by cholera, as by any other foreign foe, calls for defence not at our seaports only, but in an unbroken circle all round the island. Such a coastguard system against disease can only be provided at the cost of the country.

L

RECENT RESEARCHES.

The Influence of Desiccation on the Typhoid Bacillus.

Uffelmann has an important paper on the influence of desiccation on the typhoid bacillus, and the possibility of the transportation of the latter through the air (original communication, *Centralblatt für Backteriologie*, Jan., 1894). Experiments bearing on these questions have been so far very few. In some epidemics of typhoid it has appeared probable that the virus has been conveyed neither by water, nor articles of food, nor yet by direct contact, but through the air. Lassime, in his Thesis (*Propagation de la fièvre typhoïde par l'air*, Paris, 1890), came to the conclusion that these microbes could be conveyed by the atmosphere from dried-up material containing them, and still be capable of propagating; while Siccard (*Semaine Medicale*, 1892) found the microbes in the expired air of typhoid patients. Siccard's experiments, however, are not perfectly free from objection. Uffelmann has made an exhaustive investigation to determine how long the microbes in question are able to resist desiccation, and whether they can be carried about by dust in the air and still retain their vitality. He moistened (*a*) garden soil, (*b*) white sea sand, (*c*) house and street sweepings, (*d*) linen, and (*e*) wood with typhoid cultures, after they (with the exception of the wood) had been previously sterilised. All these substances were then placed in open vessels in cupboards at 15° Reaumur, and protected from sunlight. To prove the identity of the typhoid microbe the following properties were made use of: (1) the form and movement of the rods; (2) the appearance of its growth in methyl-violet gelatin; (3) its behaviour with gelatin containing 2 per cent. lactose (no fermentation); (4) its behaviour in milk (no curdling).

The Soil was sterilised at 140°, pulverised, moistened with the typhoid culture, and placed in the cupboard. After twenty-four hours the mass was thoroughly dry again. It was once more finely powdered. It was found that, even after twenty-one days, it was possible to cultivate true typhoid colonies from the mass.

Clothing Apparel.—The linen of a typhoid patient is often soiled with the excretions, and after recovery it may be laid aside without previous disinfection. It is then possible for the typhoid bacilli to become diffused into the atmosphere, and subsequently inhaled. This latter danger is greater in the case of those who handle the linen. Several pieces of linen (16 centimetres square) were sterilised in hot air, dried, and smeared on both sides with sterilised fœces, to which a typhoid culture in the proportion of 1·3 had been added. After several hours the areas appeared quite dry; they were resmeared and placed in the cupboard. By means of sterilised scissors small pieces were then cut out, teased on sterilised mica plates, and placed in nutrient gelatine. Pieces removed in this way, up to the sixtieth day, developed colonies of the typhoid bacillus. The experiments were varied in several ways. Currents of air were directed over the dried substances, and the particles caught in nutritive media. All these experiments gave positive results. Uffelmann concludes (1) the typhoid bacillus possesses great powers of resisting desiccation; (2) that living typhoid germs may pass into the atmosphere from the soil or from clothing, or from the dust of contaminated floors, and may then pollute articles of food, as milk. The possibility of the conveyance of the virus by means of air must be admitted.

The Influence of Desiccation on the Cholera Bacillus.

Similar experiments *re* the cholera bacillus have been instituted by William (*Zeitschrift für Hygiene, Band XVII.* 1). Hesse had previously obtained positive results. He dipped pieces of shirting in a cholera-bacillus culture and dried them. After several hours he rubbed and shook them over nutrient agar agar. Even after 22½ hours cultures could be propagated from the falling dust. Hesse therefore considered the danger a real one, and that articles of food exposed to dust containing bacilli might communicate the infection. The objection to Hesse's experiments lies in the fact that the particles were too large and might easily contain and protect living bacilli in their interior, also they were too large to be wafted about by the draughts of air occurring in well-ventilated rooms. William pounded 20 c.c. of the very finest school dust with ten drops of a cholera-culture for half-an-hour. After this time the comma bacillus was dead and the dust was innocent. If the trituration lasted five minutes, living bacilli existed even three hours afterwards in the dust. The dust being placed in a flask, several litres of air were aspirated; in the dust of the air extracted, the presence of the cholera bacillus could not be demonstrated. The experiments were variously modified, but the results were uniform. After the atomisation of the dust into a large space of air, two hours afterwards, the cholera bacilli were no longer visible. William concludes: Although the most favourable conditions for the conveyance of cholera bacilli by currents of air had been obtained, still it was impossible to prove that such took place. By mixing simply the cholera germs with dried dust the former die in a few hours, and still more quickly when a stream of air is directed through them.

On the Poisonous Properties of Expired Air.

(Beu, *Ueber die Giftigkeit der Exspirationsluft. Zeitschrift für Hygiene, B. XIV.* 1. 93; Rauer, *Zeitschrift, XIV.* 3, and Merkel, *Zeitschrift für Hygiene, XV.* 1.)

Beu and Rauer arranged a series of air-tight glass cages (into each of which a mouse was placed) in connection with each other, so that the second

breathed the expired air of the first, the third inhaled the breath of the first and the second, and so on. Only the first breathed a pure, unvitiated atmosphere. By means of a water pump a continuous stream of air was aspirated through the whole apparatus. The last animal died first, then the last but one. The experiment lasted nine days. The organic substance obtained from several thousand litres of expired air had no action on small animals whatever. Beu therefore considers that other noxious influences, as exhalations from the skin and excrement, are at work, and are responsible for the effects. Rauer, on the other hand, could not prove the existence of an organic body, and ascribes the results to an accumulation of carbon-dioxide. Merkel obtained 100 c.c. fluid from 2,500 litres of expired air, and this induced no disturbances when injected beneath the skin of mice. He then sought to combine any possible organic base with hydrochloric acid, acting on the supposition that the former had escaped condensation. The experiments had a like result. He then inserted a glass tube, containing sulphuric acid, between the third and fourth mouse in the series of cages. Air was again slowly aspired. No. 3 died first, but No 4 did not die. It would seem probable that the accumulation of the carbon dioxide plays no part in the toxic effects, and may be neglected but that there is some substance which is either destroyed by the acid or combines with it. The latter is probably correct, since Merkel found that a solution of 0·1 per cent. hydrochloric acid was just as effectual as sulphuric acid in warding off the poisonous effects. Moreover, after aspiring large quantities of expired air through a 0 1 per cent. solution of hydrochloric acid, the latter, on evaporation, yields a residue, from which chloroform dissolves a small quantity of an organic body.

On the Activity of Disinfectants at Higher Temperatures.

(*Ueber die Wirksamkeit des Disinfections mittel bei erhohter Temperatur, Archiv für Hygiene, Band XIV.*)

Heider used cultures of the spores or bacilli, and mixed them with definite strengths of the disinfectants. Staphylococcus aureus was killed in three minutes at 60°, when heated with 1 per cent. carbolic acid, 1 per cent. sulphuric acid, 0·5 per cent. lysol, etc. A 1 per cent. solution of perchloride of mercury required 54 hours at the room temperature to kill the spores of anthrax; at 55° C. two hours sufficed. A 5 per cent. solution of chloride of zinc killed them at 55° C. in two and a-half hours; the same strength of copper sulphate in six hours and a-half; 1 per cent. carbolic acid at 55° in eight hours, at 75° in an hour and a-half. Heider recommends, therefore, warm disinfectant solutions instead of cold, since the activity is thereby considerably quickened. For soiled linen, etc., he recommends steeping for six hours in a 1 per cent. solution of lysol, and subsequent boiling for one half-hour.

ANALYTICAL NOTES.

It is remarkable how many analysts retain old and inaccurate processes, when new and improved have been in existence a long time. The estimation of fat in milk is a case in point. Even now some analysts are to be found apparently content to estimate the fat by the simple but inaccurate method of digesting the "total solids" three or four times with ether, and weighing the extracted fat, when it is well known that only some four-fifths of the total fat present can by such means be extracted, and the result is the "solids not fat" is calculated too high. The most recent method, the merits of which are now generally recognised, is that known as the "Schmid" process. This is gradually displacing the more toilsome, though not less accurate "paper coil" method. While an estimation cannot be carried out by the latter method safely under three hours, an extraction by the "Schmid" process (as modified by Mr. A. W. Stokes), can be made within half an hour or less.

The following is a short description of the procedure: 10 c.c. of milk are pipetted into a special form of tube (12 in. in length, 6 in. of the middle part being somewhat contracted and graduated into $\frac{1}{5}$ c c.). 10 c.c. of strongest hydrochloric acid are now added, and the mixture heated to boiling point, carefully over a Bunsen flame, and then cooled in running water, ether is now added, and the corked tube inverted slowly some half-dozen times, when the ether will have dissolved out all the fat, and the ethereal solution will be supernatent on the acid serum. 20 c.c. of this ether are now pipetted into a small tared flask, evaporated, and the residual fat weighed. The remaining few c.c. of ether left in the tube are read off and the percentage of fat calculated.

The Public Analyst for Paddington, in his report for the past quarter, remarks the sources of milk adulteration. He tells us that from the railway stations 79 samples were taken as the milk came direct from the country farmer; 13 of these samples, or an average of 16 per cent., proved to be adulterated. From shops, on week-days, 33 samples were obtained, of which 7 samples, or 21 per cent., were adulterated. On Sundays, 10 samples were purchased in shops, and 4 of these, or 40 per cent., were adulterated. From itinerant milk vendors in the streets, 15 samples were procured on week-days; of these, 1 sample, or 6⅔ per cent., had been tampered with. From street vendors on Sundays 54 samples were taken, and 15 of these, or 27 per cent., were found to be watered or skimmed. From this it is evident that on ordinary days one may expect to find one out of every six milks that are purchased to be adulterated; while on Sundays the probability is that about one out of every three milks has been tampered with.

B. Neumann has found that Nessler's solution gives a distinct reaction with ammonia in alcohol of all strengths, and not as was stated by L. L. de Koninck ("Zeit. Anal. Chem., 1893"), that it gave no reaction. Neumann suggests that the sample of Nessler's solution de Koninck used was the source of error.

To give an artificial glaze to roasted coffee, a liquid is now being used, which appears to be nothing more than a very pure petroleum oil. It has a specific gravity of 0·868 at 15° C., is free from taste or smell, burns with a sooty flame, and leaves no fixed residue; it gives no reaction with chromic acid, and only a light brown colour is developed with strong sulphuric acid.

F. Gantter ("Zeit. Anal. Chem.," XXXII., 411).—The frequent occurrence of earth-nut oil in margarine renders the identification of the latter in butter an easy matter. Butter containing so little as 1 per cent. of earth-nut oil will give a dark brown-red colour when treated with concentrated sulphuric acid ("Analyst," XVIII., 183); pure butter should give a straw yellow or reddish yellow colour. The iodine number of butter fat, as determined by Gantter's method—employment of a chloroform solution of iodine instead of Hübl's solution—should be between 13 and 16; that of earth-nut oil is 49-51.

C. Caspari and A. Dohme, in the "Pharm. Rundsch.," XI, 229.—The conventional method for the determination of alkaloids in drugs consists in extracting them in a state of approximate purity, and weighing the substance thus obtained. This approximation to purity usually leaves much to be desired. The volumetric method is much to be preferred. His strength of conviction may be gathered from the following dicta:—(1) The volumetric method for determining alkaloids in drugs by means of a standard acid is the most reliable with which we are at present acquainted. (2) Gravemetric results, which are stated as representing the contents of pure alkaloid, are in most cases erroneous.

Cholera in Belgium.—From the report of the Inspector-General of Civil Health and Hygiene at Brussels it appears that in 1892 there were 1,861 cases of cholera, of which 953 were fatal, making a mortality of 51 per cent. In 1893 there were 615 cases with 372 deaths, or a mortality of 60 per cent. The greatest number of cases last year was in September. Most of the cases were in Hainault and Antwerp, the number in other parts of the country being comparatively insignificant.—*Progrès Méd.*

HOSPITALS FOR TUBERCULOUS CHILDREN.

A small private hospital was founded in 1889 by anonymous liberality at Ormesson (Seine et Oise, France) for the gratuitous treatment of poor children of the male sex afflicted with tuberculosis.

Originally intended for 25 beds, although capable of extension to 200 beds, it has been so evidently useful and so well supported by private subscriptions as to lead to the foundation of a supplementary hospital at Villiers sur Marne, intended for the accommodation of 80 more children.

The new hospital is to consist of a basement surmounted by a large hall. The basement will contain heating and ventilating apparatus, and between them a room for hydrotherapy provided with a large tank and a stream of running water. The large hall or ward over the basement will have an arched ceiling 12 metres (nearly 40 ft.) above the ground level, large bay windows, and two superposed galleries 13 ft. wide running round the ward, leaving a large central space. The lower gallery will open into the garden, while the upper one at the first floor level will open on one side onto a terrace, on the other onto a big staircase inside which will unite the two galleries. The galleries are to be divided by a longitudinal partition about 6 ft. high, into two unequal parts, the larger for the beds, the smaller for lavatories, w.c.'s, nurses' rooms, and offices. The walls are to be covered internally with an impermeable coat, and all angles will be rounded off for cleansing purposes.

The warming and ventilating inlets are to be in the embrasures of the windows, the incoming air being filtered through metallic gauze and porous caps, either direct from outside or after being warmed. The foul air will escape by numerous openings from a turret in the roof, being aided by a jet of steam. The cubic space will be 10,000 cubic metres, or 120 per head. The atmosphere of the hall can be renewed every hour, and there are ingenious arrangements for the introduction morning and evening of air medicated with creosote, eucalyptol, and turpentine. Ozone will be generated by the electric light apparatus, and introduced by a series of tubes at the head of each bed. The original scheme included the establishment of a convalescent home near St. Raphael, and a farm for the training of those children who after recovery are without suitable homes.

There is a sister hospital at Villepinte for the reception of female tuberculous children. The management is vested in a board of distinguished medical men in Paris, who decide whether applicants are to be treated there, or sent to one of the country hospitals.—*Revue Sci.*

SANITARY WORK IN THE COUNTY OF DURHAM.

At the last meeting of the Durham County Council, Dr. Eustace Hill, the medical officer of health, presented a lengthy report, in which he dealt with the general sanitary condition of a large number of villages in the county. Judging from the report, sanitary work in many parts of the county has in the past been grossly neglected, and, though its powers are at present greatly restricted, the County Council appear to have plenty of work before them in carrying out the provisions of the Housing of the Working Classes Act. Damp, insanitary houses, defective drainage, insufficient water supply, want of privy accommodation; some, or all of these defects, are stated to exist in the majority of the places mentioned in the report, of which the following extract is an example:—

"*South Wingate.*—The sanitary condition of this village is extremely bad under their present condition; a large number of houses are quite unfit for habitation owing to dampness, want of privy accommodation and proper drainage, and other defects. This is especially the case with regard to houses in High Row, Middle Row, Low Row, and Pond Row. Throughout the village there are to be seen large accumulations of ashes and filth. The distribution throughout the village of the water used for domestic purposes is very inadequate, as there is only one stand-pipe from which water can be obtained, and that is placed at some hundred yards distance from many of the houses. In the list of insanitary houses at the end of the report I have included some of the houses which are the most insanitary, but there are many others which, unless put into proper sanitary repair, should be closed."

In his report Dr. Hill publishes a list of houses which he considers in their present condition to be unfit for habitation, and it is satisfactory to learn that the County Council has directed that notices under section 45 of the Housing of the Working Classes Act be served on the various sanitary authorities in whose districts the houses are situated.

The report contains a comparison of the quarterly vital statistics of the administrative county, with those of the three County Boroughs and of England and Wales, and concludes as follows: "The death-rate and infant mortality rate during the quarter were exceptionally high, both being in great measure due to the large number of deaths from diarrhœa. The mortality from typhoid fever was also extremely high, the deaths from this disease during the quarter being a larger number than occurred during the whole of 1892. As diarrhœa and typhoid fever are the two diseases most intimately connected with filth conditions, their extreme prevalence in the county cannot be regarded as insignificant."

The Durham County Council has also decided to appoint a sanitary inspector to assist in the work entailed by the administration of the Rivers' Pollution Acts, and to act generally under the county medical officer in sanitary matters.

RABIES IN MADEIRA.

In the "Ann. de l'Inst. Pasteur" for December, 1893, there is an interesting report by M. Goldschmidt on a recent outbreak of rabies in Madeira, which raged for six months and caused many deaths from hydrophobia. The population of Madeira is stated to be about 130,000, of which 25,000 are in Funchal, the rest being sparsely scattered over the island. The number of dogs is estimated to be about 11,000, nearly all of mongrel breed, and many of them ill-fed and neglected. Rabies, however, was quite unknown in Madeira before the middle of 1892, just as it still is in the Canaries and in tropical Africa. But in the early part of June, 1892, the disease appears to have been introduced into the island, notwithstanding the strict supervision of the Customs officers; and by the end of the month there was already a formidable epizootic among the dogs, cats, and goats in every part of the island. During the height of the epizootic 300 deaths of dogs from rabies were reported, in three months, in the southern half of the island, and in addition more than 100 suspected dogs were killed at the Municipal Depôt. The disease ran a rapid course, with a mean incubation period of 25 to 30 days in dogs, and a mean duration of symptoms of four to five days.

One case of recovery was recorded, in which more or less paralysis remained for four months after the attack. In the same part of the island, which has a population of 60,000, there were nine deaths from hydrophobia. The mean incubation period here was from 40 to 60 days The results of treatment were negative; but one patient, who was brought to the Pasteur Institute, recovered and remains in good health 12 months afterwards. Very little seems at first to have been done to put a stop to the epidemic, but when once the serious nature of the outbreak was realised it was rapidly stamped out by a universal muzzling order, together with the destruction of all sick, suspected, or ownerless dogs. The last case of rabies was reported early in December, 1892, and the last case of hydrophobia in the previous month, if we except that of a child who died on September 14th, 1893, nine months after being bitten. The outbreak is an interesting example of the behaviour of a contagious disease in a virgin soil, and of its prompt suppression by suitable measures of isolation.

REPORTS ON OUTBREAKS OF SMALL-POX.

Two valuable reports on this subject have reached us. They support the conclusions already furnished by the outbreaks at Warrington, Leicester, etc., and will, we trust, do much to counteract the general and increasing tendency to laxity in the compliance with the law as to vaccination.

The following extracts are from these two reports:—

Halifax.

By D. Ainley, M.R.C.S., L.R.C.P., etc., M.O.H. for Halifax.

The general results as to cases admitted to the small-pox hospital may be summarised as follows: Total cases of small-pox 513, deaths 44, mortality per cent. 8·5. Vaccinated cases 425, deaths 8, mortality per cent. 1·8. Unvaccinated cases 88, deaths 36, mortality per cent. 40·9. Two cases of revaccinated persons; first revaccinated inefficiently five years ago; second revaccinated 34 years ago. Officials: One only attacked, and that during first week of epidemic, not revaccinated; all others revaccinated and none attacked. Doubtful cases omitted.

The death-rate among the unvaccinated was thus more than twenty times greater than that of the vaccinated class. Had the attacks in the vaccinated class proved fatal at the rate of those in the unvaccinated, the deaths would have numbered not eight, but 170. Whilst, if the death-rate among the unvaccinated patients had been that of the vaccinated class, the 36 deaths of the unvaccinated persons would have been under two deaths.

In regard to age among the two classes we find that the percentages of total attacks in each were as follows at the several age groupings:—

	No. of cases among		Percentage of total attacks among	
	Vaccinated.	Unvaccinated.	Vaccinated.	Unvaccinated.
Under 5 years ...	0	50	0 0	56·8
5 to 10 ,, ...	4	17	0·9	17 0
10 to 20 ,, ...	86	5	20 2	5·6
20 to 30 ,, ...	146	5	34·3	5 6
30 to 40 ,, ...	114	6	26 8	6 8
40 and upwards ...	75	5	17 6	5·6
All ages ...	425	88	100 0	100·0

The matter stands thus: A vaccinated community has had 99 per cent. of small pox at ages over ten years. An unvaccinated community has had 76 per cent of its small-pox in persons under ten years of age. This is only another instance showing alike the need for infantile vaccination, and for revaccination of persons on reaching ten years of age.

The mortality rates per cent. of attack at one and another age period in the two classes show that small-pox was unable fatally to attack a vaccinated child under ten years of age, and had but small fatal effect until the age of forty was reached. Whereas, among the unprotected class, the first five years of life and ages over ten years, formed ripe harvests for the fatal form of the disease.

Not only do we see the greater mortality in the unprotected, but where the cases have not ended fatally, there is an enormous difference in the degree of severity of attack.

The effect of vaccination has been to ensure the mildest form of attack, and in 77·4 per cent. of cases, as against 10·2. It ought to be stated that eleven of those said to be unvaccinated were vaccinated after they had caught the infection. The unvaccinated class therefore gets the credit for the protective power of vaccination in these cases. If we correct the figures accordingly, the 10·2 per cent. of discrete cases in the unvaccinated will be reduced to 5·6 in unprotected persons, and semi-confluent and confluent cases have only amounted to 22·5 in place of 89·7 per cent. in unvaccinated individuals.

Taking the several age groupings, the percentage of attacks of the three kinds of the total at each period of the two classes, show the small proportion of the severer form of small-pox among vaccinated persons up to thirty years of age, with a preponderance of the disease in its mild character, and this latter quality entirely absent; in the other class, in persons over ten years of age, the severer form predominating all through life. The exact figures are stated graphically on the diagrams.

Salford.

By Charles E. Paget, M.R.C.S., D.P.H., M.O.H. for Salford.

There was a total of 173 cases of small-pox during the whole outbreak; there were a considerable number of associated cases in private dwellings due to neglect of vaccination precautions; there was only one case of association in a single common lodging-house; and the spread of the disease in the borough was not due in any special degree to the action of vagrants. The disease was certainly introduced by a tramp, but the social and commercial relations existing between Salford and its neighbour Manchester, where small-pox was very prevalent before it assumed epidemic proportions in Salford, much more largely contributed to the introduction of fresh doses of infection. It remains to consider how far the inhabitants of the borough were in a position to resist the special dangers to infection to which they were exposed. In this connection, as I have before indicated, I am unable to estimate the approximate amount of protection which was sought during the epidemic by means of private vaccination or revaccination. The amount of protection sought at the hands of the public vaccinators was ridiculously small, but we can be sure of its having been effectually bestowed. We can also be sure that many practitioners in the borough performed the operation completely and well when applied to; but among

the poorer classes the dislike to more than one insertion of vaccine lymph is so strong that we cannot be sure that a sufficiently large amount of protection was generally afforded among them.

We learn from Table II.—(i.) That there were more males affected than females, the proportion being 109 to 64; (ii.) that there was a higher per-

From Table III.—(i.) That there were 132 vaccinated as against 35 unvaccinated persons who suffered from small-pox, and six persons in whom vaccination was doubtful; (ii.) that the percentage mortality among the vaccinated was 6·8, as against 34·3 among the unvaccinated, and 16·7 among those in whom vaccination was doubtful;

HALIFAX.

Diagram showing the proportion in each hundred persons of the "Vaccinated" and "Unvaccinated" Classes respectively that have been attacked with Small-pox during the recent epidemic, distinguishing fatal and non-fatal cases.

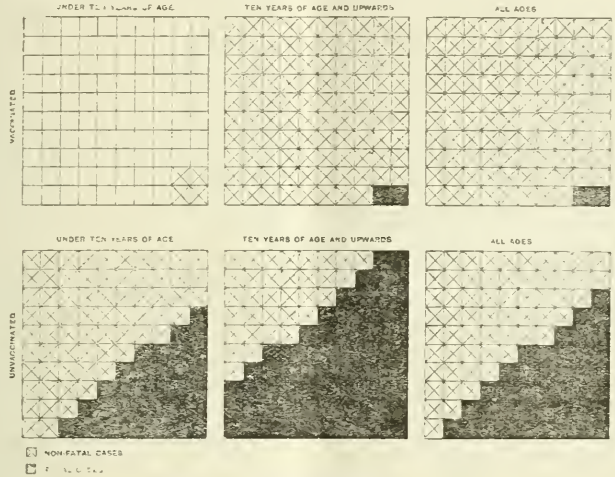
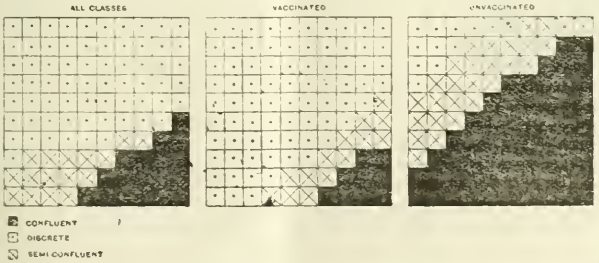


Diagram showing the proportion of cases of Small pox of the Confluent and Discrete types respectively which occurred in persons at all ages of different classes in the recent epidemic of Small-pox.



centage mortality among the males than the females; and (iii.) that the greatest incidence of the disease was, in both sexes between the 15th and 40th years of life, when, as I have already pointed out, the protection given by vaccination in the earliest years of life had become less durable and ought to have been repeated.

(iii.) that, among the vaccinated under 20 years of age none died, and that the mortality among them increased with their age above 20 years; (iv.) that among the unvaccinated all under one year of age died, and that above that age there were very high mortalities.

And from Table IV.—(i.) That among the

vaccinated there were less than 40 per cent. of severe cases; (ii.) that among the unvaccinated there were six times as many severe cases as mild ones; and (iii.) that among those in whom vaccination was doubtful there were twice as many severe cases as mild ones. It is further to be specially noted in this connection that there was no single case of a person being revaccinated in time taking the disease. This seems to me to be a conclusive fact in favour of revaccination.

A STATISTICAL PROBLEM.

GIVEN DEATH-RATES OF A TOWN AND A SUB-DISTRICT OF KNOWN POPULATION TO FIND THE DEATH-RATE OF THE REMAINDER OF THE TOWN.

By J. SPOTTISWOODE-CAMERON, M.D., B Sc.,
Medical Officer of Health, Leeds.

IT sometimes happens that in studying the mortality, from the various groups of causes, of a sanitary sub-district it is desirable also to calculate rapidly the death-rates of each group for the whole of the *rest* of the town. This can be done for each cause in the usual way by deducting the deaths from that cause in the sub-district from those in the town, and calculating the rate upon the town population, less that of the sub-district. For a single calculation this process is simple enough, but when a number of rates are required it is tedious, and I have accordingly adopted what is, I think, on the whole, a convenient and shorter process.

Let Δ, D and P be respectively the death-rate, deaths and population of the whole town, and δ, d and p those of the sub-district. Of course $\Delta = \frac{D}{P}$ and $\delta = \frac{d}{p}$, and the death-rate of the town, less the sub-district, is $\frac{D - d}{P - p}$.

But $\frac{D - d}{P - p} = \frac{\Delta P - \delta p}{P - p} = \Delta + (\Delta - \delta)\frac{p}{P - p}$

This formula may be translated into words as follows:—

RULE: *Multiply the difference between the death-rate from any cause of the whole town and one of its sub-districts by a factor found by dividing the population of the sub-district by that of the whole town, less the sub-district. Add (algebraically) the product to the rate for the whole town. The (Algebraic) sum is the rate for the town, less the sub district.*

EXAMPLE.—In 1892 the South-east Division of Leeds, with an estimated population of 33,841, had a mortality from *all causes*, from the *seven zymotic* diseases, from *croup*, from *phthisis*, from *respiratory* diseases, and from *all other* causes respectively of 24·14, 2·88, 0·42, 1·84, 6·47, and 12·54; while in the Borough the corresponding rates were 19·44, 2·18, 0·13, 1·40, 4·54, and 11·19. The differences (all negative), 4·70, 0·70, 0·29, 0·44, 1·93, and 1·35, multiplied by the factor, 0·099 (obtained by dividing 33,841, the population of South-east Leeds, by 341,699, that of the rest of the town) give 0·47, 0·07, 0·03, 0·04, 0·19, and 0·13. These numbers algebraically added to (that is to say, here all subtracted from) the rates for the Borough, give 18·97, 2·11, 0·11, 1·36, 4·35, and 11·06, as the corresponding rates for the City, less this particular district. It will be noticed that the last five add up to 18·99. The rate for the whole Borough is 18·97. This rate (18·97) corresponds to the one calculated in the ordinary way.

One advantage of this method is that it is available for the death-rates for periods of any length—a week, a fortnight, or a quarter—if calculated on the same populations, and even for those in different years, if the ratio of the population remains the same. Thus, if South-east Leeds were increasing in population at the same rate as the whole Borough, the factor, 0·099, would serve equally for 1892 and 1899.

REPORTS OF COUNTY MEDICAL OFFICERS OF HEALTH.

IN commenting upon the reports of county medical officers of Health for the year 1892, all of which have now been presented, our main object is to call attention to the obvious good which has resulted from the appointment of such officers, rather than to attempt to review the reports themselves, which are, of course, lengthy and important documents dealing with the statistics of many districts, and comprising summaries of the year's sanitary work in each. The reports are for the following counties, viz.: Derby (Dr. Barwise), Durham (Dr. Eustace Hill), Lancaster (Mr. Sergeant), Stafford (Dr. Reid), Surrey (Dr. Seaton), West Riding of Yorkshire (Dr. Whitelegge), and Worcester (Mr. Fosbroke), in all of which the medical officers have been appointed to devote their whole time to the work; also, Chester (Mr. Vacher), Essex (Dr. Thresh), and Warwick (Dr. Bostock Hill), where the county councils have not yet made permanent appointments, but have retained the services of the gentlemen named to prepare summaries of the reports of district medical officers of health, and to advise the councils when specially called upon to do so.

The reports in question are framed on similar lines to those of former years, the general plan being to give a short summary of the district reports under subject headings, followed by a special summary of each report. In Staffordshire and the West Riding of Yorkshire, however, the reports are more fully summarised under subject headings only, although in the case of Staffordshire a concise summary of each district report is

given in the form of a table. Also in the Yorkshire report is included an instructive summary of the sanitary work of the county council—a most useful addition which might, with advantage, be introduced into all county reports.

The Cheshire County Council are to be congratulated on having taken a partial step towards exercising the sanitary powers they possess, and no doubt they, as well as the Councils of Essex and Warwickshire, will in time see the wisdom of electing permanent officers. Indeed, in view of the recent Act of Parliament conferring large powers on county councils for establishing and supervising isolation hospitals, it is to be hoped that medical officers will be appointed in every county, otherwise, we fear this Act, like some others, will be inoperative throughout a large portion of the country.

It is satisfactory to notice that, through the action of the county councils, many of the district reports which formerly were presented in manuscript form are now printed. In the West Riding of Yorkshire, for example, out of 170 districts, the number of printed reports have increased from 36 in 1889 to 93 in 1892. In Staffordshire, whereas formerly 23 only out of 56 reports were printed, the number now amounts to 47. In the 51 districts in the county of Durham, 42 reports are now printed, as compared with 25 formerly. In Lancashire it appears that more than half the reports are still unprinted. There is a general concensus of opinion that the standard of the reports of local medical officers of health has much improved, and no doubt this is largely owing to the practice of printing these reports becoming more general. Dr. Seaton, however, speaks less favourably of several of the reports which he receives, and attributes their meagreness to the fact that many medical officers of health are engaged in private practice, and are inadequately paid for their public health services.

As regards provision for the isolation of infectious cases, with the exception of Warwickshire, where hospital accommodation is said to be pretty generally available, the counties are badly off in this respect, and in many cases where hospitals exist they are not made use of to the fullest extent. Many districts are unprovided with disinfecting apparatus, and even where these exist they are, as a rule, antiquated, and more or less useless. It is satisfactory to note that steady progress has been made in most of the counties in extending the area in which the compulsory Notification Act is in force. As regards the notification of measles, Dr. Eustace Hill writes: "There can be no doubt that the cost of notifying measles is very heavy, and, judging by the experience of towns which have given it a fair trial, it would appear that unless there is compulsory notification of the disease throughout the country, along with compulsory isolation of the early cases, little benefit will result." On the other hand, Mr. Fosbroke, in commenting upon certain remarks of the medical officer of health of Kidderminster in support of the notification of measles, says: "I fully agree with these remarks of Dr. Corbet, and support the scheduling of measles as a notifiable disease. I do so, not because I deem it practicable at present to remove patients to hospitals, but because I am convinced that official visits lead to the isolation of children, and reduce the risk of exposure to cold."

As regards the question of river pollution, which involves, as a rule, that of the sewering and drainage of districts, considerable activity is being displayed in most of the counties, although the weakness of the River Pollution Prevention Act is said to retard progress in many cases. In Lancashire, however, where two joint committees have been formed for the watersheds of the rivers Mersey and Irwell, and the river Ribble, and where a special Act has been obtained, this difficulty apparently is not experienced. Unquestionably, a new Rivers Act for the whole country is much needed.

It would appear that in most of the counties the question of scavenging and disposal of excrement and refuse is receiving considerable attention, and in many towns water-closets are taking the place of the highly-objectionable privies which are still so commonly met with. Slop-closets are being largely introduced, and are recommended as substitutes for privies by the medical officers of Derby, Durham, Lancashire, and Staffordshire.

As regards water-supply, it is disappointing to find that many rural authorities make no use of their powers, and allow new houses to be occupied without a certificate having been obtained as to their water supplies. Mr. Vacher calls attention to the restriction "reasonable cost" in the Public Health Water Act, 1878, and says that "as long as the powers given have much limitations the water supply in many districts will be insufficient, and shallow wells, so liable to pollution from the surface, will be used." In Staffordshire the water supply, on the whole, is satisfactory, as the mains of large water companies in the north and south of the county are within a reasonable distance of most districts, and there are also other public town supplies. This seems to be the case also in Warwickshire. In Worcestershire there is considerable room for improvement, although much work is now in progress for supplying districts with water. In this county a representation was made to the Local Government Board concerning the defective water supply in our rural district, and an inquiry was held, the result of which was not known when Mr. Fosbroke's report was published. Dr. Thresh gives the figures of analyses of various public supplies in Essex, and calls attention to the defective supplies in rural districts in the following terms: "In probably every district certain parishes or portions of parishes are stated to have no water

save such as is derived from ditches, ponds, or shallow wells sunk in a polluted subsoil. In other places wells are improperly made, and springs unprotected and liable to intermittent pollutions. Very many cases of typhoid fever, including one or two epidemic outbreaks, were during the year attributed to the use of these polluted waters. Amongst the sanitary improvements effected during the year the improvement of village water supplies is rarely mentioned, yet this is the direction in which, perhaps, most could be done, and which is most to be desired. There are comparatively few villages with a supply of water laid on to the houses or to standpipes near, and in only two or three districts are such supplies being contemplated.

The question of infant mortality receives prominent notice in most of the reports. In the Staffordshire report, Dr. Reid gives figures which confirm the opinion he formed, after special inquiry, the result of which appeared in his report for 1891, that the employment of married women in factories has a most injurious influence in adding to the infant death-rate. To this cause Mr. Fosbroke attributes the excessive rate in Oldbury, and Mr. Sergeant points out, as regards Lancashire, that he has previously advocated the establishment of day nurseries, and hopes that "the experiment will be tried by the philanthropically disposed." Dr. Barwin recommends that children under the age of ten should not be eligible for insurance, except in "properly-regulated burial clubs, which actually carry out interments without giving money into the parents' hands."

Among other subjects dealt with are "Housing of the Working Classes," "Bye-laws," "Popular Lectures on Hygiene," etc.; and a perusal of the reports will well repay those who are interested in the sanitary administration of the country.

THE PATHOLOGY OF PHTHISIS.—How do the tubercle bacilli reach the pulmonary apices? A curious answer to this question is given by Volland ("Zeitschr. für Kl. Med.") which is ill in accord with commonly received views. He rejects the theory of air-borne infection as unproven and improbable, and believes that the bacilli are mechanically conveyed from the floor to the nasal and buccal mucous membranes, especially during early childhood, thence to find their way through the lymph glands of the neck to the apices of the lungs, either by the right lymphatic duct and lesser circulation or by more devious ways. In support of this theory he points to the frequency of strumous glandular disease in early life, and states that in 2,506 young people from seven to 24 years of age examined in Switzerland, 96 per cent. had enlarged neck glands during school-going ages, and nearly 70 per cent. over 16 years of age. He would have us prevent little children who are learning to walk from touching the floor with their hands, and be very careful to frequently remove the nasal mucus.

METHODS OF SEWAGE DISPOSAL.

THE SCOTT-MONCRIEFF SYSTEM.

THIS pamphlet describes Mr. Moncrieff's system of sewage purification by means of "cultivation filter beds" and "nitrifying channels," and includes the results of the chemical and bacteriological examination of a large number of samples of sewage effluents. The process consists in merely passing the crude sewage through a filter bed of flint, coke, and gravel, and then allowing it to run for a considerable distance along open channels filled with coke. The depth of filtering material is only 14 inches, and the filtration or straining takes place from below upwards. The experiments described appear to have been on a small scale, the sewage of a household of from ten to twelve persons only being dealt with. The rationale of the system is said to depend "on the following well-recognised truths":—

1. That bacteria under favourable conditions are capable of indefinite multiplication.

2. That bacteria exist in sewage which are capable of peptonizing solid organic matter, or in other words, of preparing it, by a process comparable to that of digestion, for its final disintegration.

3. That in nature the purification of the refuse of the organic world is effected by the life history of these or similar micro-organisms.

These scavenging micro organisms are supposed to accumulate in the filter bed and in some way purify the sewage, whilst in the nitrifying channels (so called) the process of oxidation, by the air and by the action of organisms is supposed to still further aid the purifying process. Whether such is the case or not the report unfortunately does not enable us to judge. Not a single analysis of a sample of the raw sewage treated is given, nor the results of a single bacteriological examination. Without such analysis, reports on the examination of the effluents are useless. Elaborate charts are given showing the variations in the "chlorine, clearness, smell, and reaction" of various effluents. The variations in the amount of chlorine are apparently regarded as indicating the different degrees to which the sewage has been purified during the process, instead of merely proving that the raw sewage treated varied in composition within very wide limits. Surely the author does not expect us to believe that the micro-organisms remove chlorides as well as organic matter. It is, in fact, difficult to treat this report seriously, for if it proves anything at all, it proves that the system is useless. Comparing the estimations of the chlorine with those of the albuminoid ammonia, it is seen that the filthiness of the effluent varied *pari passu* with the amount of chlorides present, indicating that had an analysis

* "The Scott-Moncrieff System for the Bacteriological Purification of Sewage." By Alexander C. Houston, M.B., D.Sc. (Edin.).

of the raw sewage been given, that it would have varied but little from that of the effluent. Judging, also, from the writer's own experience in the examination of all kinds of sewage, these effluents afford no proof of any purification having taken place. Large numbers of samples of raw sewage which he has examined contained less polluting matter than many of Mr. Scott Moncrieff's effluents. To have demonstrated the nitrifying action of the coke channels, assuming for a moment that they possess any such action, would have been an exceedingly simple matter. A few estimations of the nitrates and nitrites in the sewage before and after traversing the coke would have sufficed, and the omissions of such evidence renders valueless all the statements and assumptions of the reporter. The bacteriological examination is equally unsatisfactory. The effluent contained in each c.c. varied from 275,000 to 2 562,500 micro-organisms, and the raw sewage probably varied just to the same extent. The organisms found in the effluent were those found in all sewage, and the assumption that there was an "enormous development of micro-organic life in the effluents" is not founded on any facts recorded in the report.

It is, as we have just said, scarcely possible to treat a report of this character seriously; yet, strange as it may appear, the process is one of the many which, during the last few years, one leading "Daily" or another has favoured with a long and laudatory notice. According to the *Pall Mall Gazette* (June 21st, 1893), the Scott-Moncrieff process has ushered in a "new era in sewage purification." These new eras have so frequently arisen—in newspapers—but as yet without benefit to anyone but the writers of the articles, that we may be excused if we withhold our belief in the new era until a little more proof is forthcoming.

The Bacillite Process of Sewage Purification.

We have been favoured with a report on this process, which is now being tried at Kettering. Unlike the Scott-Moncrieff process, which aims at encouraging the growth of bacteria, this aims at the total destruction of all such organisms. By the addition of certain chemicals, the nature of which the inventor does not disclose, of a volatile nature, and the aid of "steam batteries," it is claimed that the purification and sterilization of sewage can be effected at a reasonable cost. Professor Percy Frankland's report is eminently satisfactory. He found by examination of the sewage before and after treatment that practically the whole of the suspended matters and 90 per cent. of the dissolved organism pollution was removed. Over 90 per cent. of the bacteria were also removed. It is worthy of remark that Dr. Frankland found in the Kettering sewage many more bacteria than Dr. Houston found in the Scott-Moncrieff effluents, in which an "enormous development" was assumed to have taken place. Other experts who have examined the Bacillite process have also reported very favourably, so that probably we shall hear more of it in the near future. The process (Hope's patent) is being worked by the Bacillite Sewage Purification Company, whose offices are in Leicester.

The "Ives" Precipitating Tanks.

Whilst chemists are devising processes for precipitating the organic matter from sewage, and for sterilizing it on the one hand, or encouraging the growths of the putrefactive organisms on the other, engineers are endeavouring to improve upon the present system of clarifying the effluent and collecting the deposited sludge. At Dortmund, in Germany, deep cylindrical tanks have been substituted for the shallow rectangular tanks usually employed at sewage works, and with great advantage. (*Vide* "Sewage Disposal Works," by W. Santo Crimp, page 254.) There are various mechanical contrivances for introducing the sewage so as to cause the minimum amount of disturbance within the tank. Complete clarification appears to be obtained and the sludge is easily removed from the bottom of the tank. Mr. E. W. Ives, of Derby, working upon somewhat similar lines, has succeeded in producing a tank which enables a large amount of sewage to be treated in a small receptacle which in form closely resembles that of a Snowdon rain gauge. The sewage is dosed with chemicals, lime, lime and iron, aluminoferric, or any other precipitating agent selected, well mixed and then allowed to flow into the tank through a pipe reaching nearly to the bottom of the cylindrical portion, and is disturbed by aid of a number of radiating arms. The sludge sinks into the conical base of the tank, and the clear liquid overflows at the surface. A tank thirty feet in diameter is believed to be capable of clarifying one million gallons of sewage in the twenty-four hours. At Tamworth two of these tanks have been fixed, one under the road close to the river. At a recent visit the effluent, though not quite clear (as is said usually to be the case), was very much better than the sewage itself. The sludge which was pumped from the tank was most viscid, containing very much less water than the sludge pumped from ordinary tanks. As these tanks only occupy one-twentieth the space of those in general use, and are much less costly, there appears to be a decided advantage in their use. The flow of sewage is constant, and no disturbance is caused by the pumping of the sludge, so that the process is continuous and does away with the necessity for duplicate tanks. The company which has acquired Mr. Ives' patent supply small experimental tanks so that the best precipitating agents for any particular sewage can be determined. The principle upon which they are constructed appears to be sound, and if such small covered tanks can be advantageously substituted for the large open ones at present used, a distinct advance will have been made in the direction of solving the sewage disposal problem.

THE GROWTH OF OPINION ON THE SELF-PURIFICATION OF RIVERS.*

By Wm. Naylor, F.C.S., A.M.I.C.E., Chief Inspector Ribble Joint Committee.

The question of the self-purification of rivers is one which has been exercising the minds of scientists since the memorable experiments of the Rivers Pollution Commissioners during the years 1867-72, to say nothing of both recorded and unrecorded investigations prior to that date.

The conflict of opinion, too, on the subject has been as great, if not greater, than that upon any other scientific question; in fact, quite a war has been waging during the past twenty years from the constantly-repeated encounters in which I venture, in a humble way, to draw a few inferences and possibly a moral.

First, let us examine the subject as put forth by the Rivers Pollution Commissioners.

In the report on the Mersey and Ribble basins, part 1, 1870, pages 18 to 22, the Commissioners reported that they had thought it very undesirable that a subject of such vital importance to the inquiry should any longer rest on mere opinion, and they, therefore, decided to submit it to careful experimental investigation. They took samples of the Mersey above Stretford Road Bridge, and also thirteen miles lower down, that is near its junction with the River Irwell, between which points few tributaries entered bringing in materially polluting matter. They also took samples from the Irwell as it fell over the weir at Throstlenest, and again eleven miles lower down near its junction with the Mersey, and again from the River Darwen below the confluence of the Blakewater with it, and thirteen miles lower down, just above the confluence of the Ribble and Darwen near Walton le-Dale.

It must be mentioned here that the volume of the Darwen was almost doubled between the points of sampling, and in the other rivers to some extent. So far as the self-purification of rivers is concerned, the results were summed up as follows:

Description of Sample.	Reduction in 100,000 parts of water.		Percentage reduction of organic elements.	
	Organic Carbon.	Organic Nitrogen.	Organic Carbon.	Organic Nitrogen.
Irwell after flow of 11 miles at temperature of 6·2° to 6·8° C.	·095	—	4·5	—
Irwell after flow of 11 miles at temperature of 12·2° to 13·3° C.	—	·028	—	11·8
Irwell after flow of 11 miles at temperature of 17·5° C.	·632	—	29·6	—
Mersey after flow of 13 miles at temperature of 4·3° to 4·8° C.	·150	·017	20·8	17·9
Darwen after flow of 13 miles at temperature of 6·8° to 10·7° C.	—	·039	—	13·2

* A paper read before the North-Western Branch on Jan. 12.

The Commissioners also experimented with mixtures of London sewage and water which they allowed to flow in a slender stream from one vessel to another. They also examined the gases dissolved in this mixture before and after agitation, but concluded that the amount of purification was inappreciable.

The report, however, pointed out that the removal by subsidence of a large proportion of the suspended impurities both organic and mineral, especially if the flow be sluggish in places, has a marked influence on the composition of the river water. It was, doubtless, this clarification by subsidence, the report pointed out, which led the way to the very general, but erroneous belief in the rapid self-purifying power of running water. The following analyses were given which show the purification of the Irwell, Mersey, and Darwen by subsidence:—

Description.	Subsidence from 100,000 Parts of Water			Percentage Reduction of Matters in Suspension.		
	Mineral Matter.	Organic Matter.	Total Solid Matter.	Mineral.	Organic.	Total.
1. Irwell, after flow of 11 miles, March 12th, 1869	·83	·48	1·36	47·8	50·0	48·6
2. Irwell, after flow of 11 miles, June 11th, 1869	·38	·84	1·22	14·3	30·9	22·7
3. Mersey, after flow of 13 miles, March 12th, 1869	·10	·04	·14	10·6	13·3	12·0
4. Darwen,* after flow of 13 miles, March 10th, 1869	·54	1·42	1·96	30·3	79·8	55·1

Soon after the appearance of these reports the late Dr. Tidy, in the "Journal of the Chemical Society" (Vol. CC., p. 268), detailed the results of a series of experiments made by him on the waters of the Thames, Lee, Severn, and Shannon. Referring to the Shannon more particularly, he drew attention to the following facts:—

1st. That the solid matter in different parts of the river ranged from 15·3 to 20·2 grains.

2nd. That in no case was there found more than a mere trace of nitrogen as nitric acid; whilst

3rd. The chlorine was remarkably constant at one grain per gallon.

Referring, then, to the various sources of impurity to which river water is subject, and the means whereby purity is maintained by nature or may be effected by art, the inquiry was limited to three sources of impurity, viz.:—

1. The influence of flood water on the general purity of the river.

2. Peaty or vegetable contamination.

3. Sewage or animal contamination.

The first of these is foreign to this subject, and I will at once allude to the second source of pollution, viz., peaty or vegetable drainage.

* Corrected as before for admix of clean tributaries.

The river Shannon is fed between the points of sampling detailed in the analyses given by many very peaty feeders. The drainage area was described by Dr. Tidy as an extensive peat bog, covering miles of country, and pouring into the river its absolutely black drainage in full-sized streams.

Analyses given in Dr. Tidy's report showed that the organic carbon and nitrogen fluctuated, increasing and decreasing in amount alternately as peaty feeders entered and the whole volume of water was allowed a certain length of run.

Dr. Tidy's conclusions were that the purity of water in rivers is maintained in spite of pollution by (1) the inherent power that water possesses of self-purification from oxidation of the peat by the oxygen held in solution by the water; (2) mechanical precipitation by admixture with coarse mineral suspended matter.

This paper was replied to in the "Journal of the Chemical Society" (Vol. CCXII., page 506), by Miss Lucy Holcrow and Dr. E. Frankland. The authors stated that they had studied upon an experimental scale the action of an exceptionally strong peaty water upon atmospheric air, so as to ascertain how far air loses oxygen in contact with such water.

They detailed a number of eudiometrical analyses, which showed that air which had been standing in contact with peaty water for varying periods of time and at varying temperatures gave up little of its oxygen to such water.

They also experimented upon the effect upon air of violent agitation with peaty water, and concluded that if the oxidation of peaty matter in water took place at all the process took place with very extreme slowness, but so far as their own experiments were concerned the point had not been proved.

In the same number of the "Journal of the Chemical Society" Dr. E. Frankland followed with another paper on "The Spontaneous Oxidation of Organic Matter in Water."

In this paper the experiments of the Rivers Pollution Commissioners were quoted, which I have already referred to; and dealing more particularly with Dr. Tidy's observations on the Shannon, Dr. Frankland rejected certain analyses as abnormal, and gave it as the chief cause of the diminution of organic carbon and nitrogen, in his opinion, to be the decomposition of the urea of the sewage into ammonic carbonate, and that this change was effected by bacteria. This change by micro-organisms he declared to be unconnected altogether with oxidation, but to be brought about according to the equation,

"$CO(NH_2)_2 + 2H_2O = CO(NH_4O)_2$."

The matter was then taken up by Professor W. N. Hartley in a paper on "The Self-purification of Peaty Rivers," read before the Society of Arts, March 22nd, 1883.

In this paper results were given of experiments made on the River Dargle, in Ireland, and also on the Carawaystick River above and below the falls of Glenmalure. Professor Hartley held that the composition of the water above and below the falls as shown by the analyses given by him was almost identical, and that aëration of the most effective character had no effect of the slightest kind in decreasing the organic constituents.

He then proceeded to show by a series of experiments that what purification was brought about in this river was not due so much to the oxidation of organic matter as the effect of the clays or the mineral constituents of the river banks and beds.

In 1875 a report was published jointly by Dr. Franz Brunner and Dr. Rudolph Emmerick on the "Chemical Changes which the Water of the Isar undergoes during its course through Munich" ("Zeitschrift für Biologie").

In this paper, after describing the tributaries of the Isar, their depths and breadths, the speed of the current and volumes of water dealt with, the condition and quantity of the sewage and general refuse emitted into these tributaries or bachen, the nature of the subsoil water and of the deposits in the sewers, the nature of chemical refuse admitted, and after shewing that their samples were not influenced by floods or any abnormal conditions whatsoever, the writers declared that the condition of the water of the fourteen brooks or bachen within the town was not changed so far as the quantity of matter in solution was concerned to any appreciable degree. Only a slight increase of organic matter shewed itself amounting to six milligrams per litre. They then gave a comparative table showing the quantity of excrement reaching the bachen between the several sampling points, the quantities of solid matter and chlorine in the same, and yet showing the increase found by analysis in the rivers or brooks to be comparatively very small indeed. They then considered the total influence of the town refuse on the whole volume of the Isar water, and on this point they spoke very definitely, as follows:—

"We are in a position to state with certainty, on the ground of several analyses, that the water of the Isar two hours below Munich carries nearly the same quantity of dissolved and suspended matter, and therefore possesses nearly the same degree of purity as the water of the river before it has reached the capital."

The result of the analysis confirmed by that of calculation, and repeated inspections of the river below Munich showed that the appearance of the river, its colour, and the number of particles suspended in it had not altered to any noticeable degree.

The authors also pointed out that the determination of nitric acid in a river water had no value for the establishment of the impurity of a river, for the simple reason that nitric acid does not as a

rule appear in polluted water. On this point they quoted Dr. Wohlff, who found that the Wornow during its course through Rostock was quite free from nitric acid, and that at a point where it was most polluted by the drainage from a gasworks and a slaughter-house ; but while Wohlff, as a cause of this disappearance of nitrates, put forth the decomposition of nitric acid into ammonia due to the nascent hydrogen arising from the decomposition of organic matter, they themselves claimed that the diminution and total disappearance of nitrates in river water to follow generally from the reducing action of organic and organised matter. On this point they quoted Schonbein, Fontenalle, Pelouse, and Liebig.

This paper was followed by one on June 13th, 1882, by Dr. F. Erismann in the "Handbuch der Hygiene," Vol. II., Sect. 1, Part 1.

This researcher stated that the pollution of river water brought about by the sewage of towns gradually diminishes and ultimately disappears under favourable circumstances in consequence of processes which are summed up under the head of self-purification of rivers. This self-purification of river water he declared to be brought about by the concurrence of the following factors :—

1. Taking up of pure water or the dilution of the impure constituents.

2. By chemical processes which go on under the influence of the atmospheric oxygen, lower organisms, and perhaps also with the assistance of the water plants.

3. By the deposition of the heavier particles in the form of mud on the bottom of the river bed and on its shores.

In 1885 Dr. Emich contributed a paper on the self-purification of natural waters to the "Monatshefte für Chemie," page 77.

The researches of the author have resulted in showing that a self-purification, a change in the organic and inorganic impurities contained in the water, only happens where vital processes are going on in plants or animals. If the water is sterilised by boiling and protected against the introduction of germs no autodepuration goes on. If, on the other hand, sterilised water be exposed to the air or contaminated by ordinary water it undergoes exactly the same changes as water allowed to stand in the air ; the quantity of organic substances diminishes as well as the quantity of ammonia, and nitric and nitrous acids are formed.

In order to decide the question whether the self-purification of waters is to be attributed to oxidation by means of the air or to a biological process occasioned by organisms, the author tested some water rich in organic substances (garden-basin or fish-pond water, or diluted "cloacal fluid") with respect to its oxidation by means of permanganate of potash, and the quantity of ammonia, nitric and nitrous acids.

First, when standing still in the air ; second, when shaken up with air ; and finally repeated these experiments after the sterilisation of the water by boiling, while he prevented the introduction of spores from the air. He concluded from these experiments, firstly, that the waters not sterilised and shaken scarcely alter so much as regards their oxidisability as those exposed to the air ; therefore, no direct oxidation takes place. Secondly, that in the sterilised water protected from spores no self-purification goes on ; thus it is dependent on the growth of organisms. In fact, it was proved that sterilised water, if the mud deposited by water exposed to the air be added to it, undergoes the same changes as the latter water, viz., that the oxidation and the quantity of ammonia decrease, nitrous acid, which disappears later, and nitric acid are formed. Also, if shaken up with ozone, the oxidation of the water is scarcely quicker than if exposed to the air. Alexander Muller had already arrived at the same conclusion as the author, viz, that self-purification is a vital process (Review from "Journal für Gasbeleachtung und Wasserversorgung," Vol. 28, page 477).

A paper read by Meade Bolton, of Virginia University, U.S.A., appeared in the "Zeitschrift für Hygiene," 1886, Vol. I., page 76.

This author in the winter of 1884 5 undertook some experiments for the purpose of investigating the question as to whether drinking water at rest was a favourable or unfavourable medium for the growth of pathogenic organisms. He hoped from these experiments to gain some fixed points concerning the way in which the dangers of infection by water come about under natural circumstances.

He made a number of experiments with both pathogenic and non-pathogenic germs in water under various conditions of temperature, pressure, and local surroundings. Concerning the method of bacteriological analysis and significance and value of the results obtained, he came to the following conclusions : —

Firstly, the number of bacteria in a sample of water affords in many cases no certain data concerning the chemical composition thereof, the degree of impurity, nor the danger of infection, since the number of bacteria capable of development is dependent principally upon the presence of the suitable water bacteria and upon the conditions necessary for the growth of the same ; also upon the temperature of the water and a number of other variable factors. Under such circumstances the *quality* of the bacteria contained in the water is perhaps of more importance from a hygienic point of view than the *quantity*.

Secondly, bacteriological analyses of water should always be made immediately after the taking of the samples in order to avoid subsequent increase of the bacteria, or the vessels should be kept at 0c. from the moment of sample drawing.

Dr. George Frank then followed with a paper on "The Changes in the Water of the Spree (Unter-

suchugen der Spree)", "Zeitschrift für Hygiene," III., page 355.

This paper opens, like most other continental papers, with a critique upon the report of the English Commission of 1868.

Then, after describing his very careful mode of sampling, points of time and place, general sewage system of the town, etc, he gives analyses of which the following are the items. Total solids dried at 110° C., oxygen absorbed, ammonia, sulphuric acid, nitric acid, and nitrous acid.

The author also made bacteriological examinations of the river water, which was diluted 100 times, from which were made three cultivations, each diluted one third of the other. About 200 analyses are given of the water at various points in the river Spree, from which the following conclusions were drawn:—

First, that the attempts made to show by statistics the influence of polluted river water upon the state of health of the population settled upon its banks have been up to the present useless, owing to the number of other circumstances which influence the general mortality, among which the ill-effects of polluted rivers cannot be seen.

Second, that experimental researches showed that pathogenic micro organisms continue to live for months in water, and can also maintain the conflict with other bacteria in the water.

The author then concludes further that, according to our knowledge, however, of the behaviour of bacteria in water, we must hold fast to the doctrine that they can be disseminated by water, and that a water polluted with them becomes dangerous to health. We must, therefore, take care that no such influences enter water as can carry with them micro-organisms of this nature.

In 1889 A. Scala and G. Alessi presented a report on "The Relations Between the Life of Micro-organisms and the Composition of Water." "Bullettino della Reale Academia Medica di Roma." Anno 15, Fasc VIII., 1889.)

After detailing a number of analyses, both bacteriological and chemical, the authors come to the following conclusions:—

First, micro-organisms may multiply when the water is placed under ordinary conditions of environment.

Second, the increase happens indifferently in waters containing materials of various origins.

Third, the diminution takes place slowly and unequally, not by deposition on the bottom of the vessels, but by death caused by failure of nutrition.

The agitation produces a slight increase, caused probably by fission of the colonies which have been formed in the water.

Fourth, the activity of the micro-organisms is exercised however on the organic material, transforming it into mineral.

Fifth, temperatures near, but above zero, do not arrest the activity of the micro-organisms.

I should here point out that in 1884 Mr. R. Warrington and MM. Schloesing and Muntz spent much time in the important investigation of the nitrous and nitric ferments.

Mr. Warrington, in 1884, showed that the nitrification of soils was brought about by an extremely minute living thing—a micro-coccus.

What is called the nitrous ferment was isolated in 1890 by Dr. Percy Frankland and Mr. Warrington in England almost simultaneously and independently of each other, and by M. Winogradsky a month later, and announced in the "Annales de l'Institut Pasteur." The methods of isolation of the nitrous ferment are described in Dr. Percy Frankland's "Society of Arts" Cantor lectures, page 952, in the "Society of Arts Journal." He says in these lectures that the nitrous ferment or nitrifying organism, of the first part of the two-fold process, can be cultivated to the exclusion of other bacteria, by a nutrient solution having the following composition:—

Composition of Solution Employed for Nitrification.—Ammonium chloride, ·5 grammes in 1,000 c.c. of distilled water; potassium phosphate, ·1 grammes; magnesium sulphate, ·02 grammes; calcium chloride, ·01 grammes; calcium carbonate, 5 or grammes.

For four years Dr. and Mrs Percy Frankland carried out a series of experiments with this mineral solution, noticing its effect by inoculation with the nitrous ferment upon minute portions of garden soil, recording the dates when nitrification first appeared, the shortest time being about six days.

This was the first stage of the process of nitrification, these organisms having the power only of converting the ammonia into nitrous acid, or in chemical equation, $NH_3 + 3O = H_2O + HNO_2$.

But another reaction awaited explanation, namely, the agency which converted this nitrous acid into nitric acid; or, $HNO_2 + O = HNO_3$, in which state alone soil becomes a fertilising medium

The micro organism which produces this nitric ferment has been isolated.

Its action has been demonstrated by Warrington and Winogradsky, by making cultivations of it in soil without ammonia, but containing nitrous acid. This microbe, unlike the nitrous ferment, does not possess the power of oxidising ammonia, but can convert nitrous into nitric acid. These two-fold processes of nitrification are constantly in operation in all fertile soil. (Wardle "Sewage Treatment.")

In 1890 Dr. William Prauznitz, of the Munich Physiological Institute, contributed a paper on "The Influence of the Sewage of Munich on the Isar, and the Self-purification of Rivers."

In this paper, Prauznitz studies the nature of the Munich sewage both from a chemical and bacteriological point of view. He gives a series of analyses showing the effect which this sewage has

immediately on the Isar, and then considers the question of the self-purification of rivers.

On this subject he points out that the researches detailed give a further proof of the existence of the process which is called the self-purification of rivers, and by which is understood the natural purification of watercourses from the impurities carried into them without artificial assistance.

This author then cites work done on the Seine at Paris by Durand Claye, by Hulwa on the Oder, Frank on the Spree, Erismann, Pasteur, Schloesing, and Muntz. He then takes the rather peculiar view that this purification is not due to organisms, in spite of the work of the foregoing authors. He states, "The question, however, is asked, if the conclusions drawn from these works can be applied to the self-purification of rivers, and whether it is proved that micro-organisms take a foremost part in this process," and declares "On the ground of the results obtained by Frank and Muller I think I must deny this. Frank has determined the quantity of bacteria above, in and below Berlin, in the examinations already mentioned and here given." (A series of results are given, and the author then proceeds.)

"In both cases we see after the moment of the greatest degree of pollution a constant decrease of the micro-organisms present, which indicates pretty certainly that they have no share in the process of auto-depuration which has here taken place. We know truly that micro-organisms above these points of pollution increase incalculably, while here we notice a regular dying away; we know, further, that their number in the purest distilled water soon becomes enormous, while here, in spite of the presence of an important and suitable nutrient medium, there occurs not only no increase, but even a rapid decrease."

The author then objects to comparison between the laboratory experiments of Muller and Emich as not being under conditions similar to those of running water. He pointed out that the decomposition of organic matter in a laboratory takes place very slowly, whereas in rivers it takes place very quickly. On this point Moser, Muller, Emich, Ullik, and other researchers are quoted, and the author further states that "if the organic substances in drawn water were to decompose as quickly as they do in the rivers a great part of the innumerable analyses of water performed by different authorities must be false and worthless, since it is only in rare cases that the analyses could be executed immediately after drawing the water. There are, therefore, three points which make it very improbable that micro-organisms are the cause of self-purification of flowing water.

"1. The immediate decrease of the bacteria in rivers polluted by sewage.

"2. The difference of the processes in the experiments performed in laboratories in support of the hypothesis of the self-purification of rivers.

"3. The difference of time occupied by the process in different places, that is, in the river and in the laboratory.

"There remains, therefore, only the third point of those stated by Erismann to account for the self-purification of rivers, namely, the process of sedimentation. The correctness of this statement can the less be doubted since there are innumerable examples to prove it."

Prauznitz claimed that the sedimentation, of course, included bacteria as well as the inert matter. To prove this longer or shorter cylindrical vessels were filled with water, and after standing for varying lengths of time the quantity of bacteria in the strata were examined. Samples were taken either by pipette from different heights, or the topmost layer was examined before and after a thorough shaking up of the vessel, whereby the deposited bacteria would be again disturbed. In this way it was proved from time to time that certain sedimentation of bacteria and inert matter took place.

The author cites results of other workers which differ from his own.

That the self-purification does not rest exclusively with sedimentation, but that the power of oxidising organic substances is held by running water in general is admitted, and even evidence given in proof thereof. One instance I must quote.

In the water of a little Belgian river, a tributary of the Scheldt, flax is laid every year during the months of April to October to loosen the woody substances, and to prepare the bast fibres for later use. This process, the steep of flax (la rouissage), takes place in the river for a distance of 73 kilometres, and, continually, rows of boxes are brought to both sides of the river in which the flax is placed. By this means the linen threads in the separate plant stems which are bound together by a gummy substance—pectose—are isolated or loosened out by the destruction of this pectose. Now, pectose is absolutely insoluble in water, and its change into pectin acid is occasioned by the decomposition brought about by the water.

Dr. Max Von Pettenkofer next read a paper at the meeting of the Medical Association at Munich on May 7th, 1890, on "The Pollution of the Isar by the Drainage of Munich."

The author, after discussing the quantity of fæces turned into the Isar, read the following letter which he had received from Professor Dr. Cramer, of Zurich:—

"From an examination which I made in 1884 of the drinking water of Basle, I noticed how quickly rivers and brooks got rid of the bacteria in them on standing. The cause of the examination was a typhus epidemic which broke out in the village of Seewen on the Grelling supply, which gave rise to a fear that the typhus might then break out in Basle.

"The quantity of bacteria in the water immediately before Seewen was very large, but after the brook had traversed the meadows there was less than half the number of bacteria in it, and this water was drunk in Basle without a typhus epidemic breaking out, though there was one at Seewen."

Dr. Pettenkofer then made a statement which has more interest to us now than it had at the time it was made, namely, "It frequently happens that towns are provided with river water without harm, partly in a filtered, partly in an unfiltered state. Hamburg has unfiltered Elbe water and Altona filtered, but both after the sewers of Hamburg have been discharged into the river." He also quoted other towns supplied with water which had been contaminated by sewage, namely, Nottingham, in England, supplied from the Trent; Albany, in the United States, supplied from the Hudson, into which the sewage of the town of Troy drains, and others.

He then proceeded to show in various ways that the pollution of the Isar by the Munich sewage was purely imaginary, and that cattle could drink of it without harm. He quoted various towns, including Aschaffenburg, where stiff necked shippers gave this answer to a police officer who asked them to collect their kidney and intestinal excretions and throw them on the land, and not into the Maine, "Oh, it does not matter, for by the time the water has flowed over three stones it is clear again."

But this is surely a very advanced view of the course of the self-purification of rivers. He also quoted the royal Bavarian town of Kissingen, a world-renowned bathing place, which had recently obtained permission to drain into the Saale.

(*To be continued.*)

THE SPREAD OF OPHTHALMIA AND RINGWORM.—At a recent meeting of the Ophthalmological Society, Mr. Jonathan Hutchinson produced evidence to show that the so-called school ophthalmia is now spreading beyond the confines of the pauper schools, and has begun to invade the middle-class schools. This increased prevalence he attributes to the persistent neglect which boards of guardians have hitherto displayed in taking measures to stamp out the disease. It is his opinion that, unless stringent precautions are taken, this form of ophthalmia will shortly become an appanage of our middle-class schools just as it has long been of schools for paupers. "From schools it will spread to private families; and unless something in our race peculiarities protects us, bad cases of the disease may become as common with us as they have long been in France and Ireland." This is a subject which is of practical importance to the whole community, as is also, we may add, the increasing amount of chronic ringworm of the scalp, which is apparently associated with, and due to the unregulated attendances of infected children at elementary day schools.

BACTERIOLOGY AND PATHOLOGY.

The Cultivation of the Bacilli of Diphtheria.—Schloffer,* taking advantage of the good results of the method of cultivating the Gonococcus-Neisser upon urine agar, makes use of it for the demonstration of diptheritic bacilli. The urine agar is made of two parts of 2 per cent. broth peptone agar and one part of sterile urine. The urine is received into a sterile vessel, or, to make sure of its sterility, re-sterilised at a temperature of 70° to 80° C. for one half-hour. The results are equal to those obtained upon Loeffler's medium, namely, coagulated calf serum and 25 per cent. grape-sugar broth. After 24 hours' incubation an opaque greyish-white fairly abundant growth is formed. For demonstrating the presence of the bacillus in the human subject, he proceeds by washing the membrane in sterile distilled water, or 2 per cent. boracic acid, and then inoculating with it the urine-agar. In 20 cases, which from the symptoms were considered genuine diphtheria, he obtained evidence of the bacillus in 18 cases, and as early as the fourteenth hour of incubation in many instances.

The Diphtheritic Bacillus in Ulcerative Endocarditis.—Howard describes, in the John Hopkins' Reports, 1893, a bacillus in a case of human ulcerative endocarditis, morphologically identical with Loeffler's bacillus.

The Vitality of the Diphtheritic Bacillus.—Abel,† in the course of some interesting observations upon this important point, says that Hofmann-Wellenhof (Wiener Med. Woch., 1888) found a cultivation to keep 155 days; Lœffler (Ber. Klin. Woch, 1890), seven months; Klein (Cent. f. Bakt., Vol. VII.), 18 months. When the cultures were dried Lœffler found colonies alive after 14 weeks. Unpublished researches of the last observer show that the dried organism exposed to ordinary daylight was dead after 121 days, but when kept in the dark were alive after 189 days. On gelatine (moist medium) kept in the dark, inoculation showed that the organisms kept their vitality for 188, 232, 299, and 331 days, but the number of colonies had decreased in proportion. Lœffler also tried the vitality of the bacilli preserved in the membrane or in mucus and dried. After four weeks the bacilli were readily demonstrated; after eight weeks the numbers were reduced. In thick pieces of membrane numerous organism were alive after 9—10 weeks, less after 13—14 weeks, but none after 16 weeks. D'Espine et de Marignac (Rev. Med. de la Suisse romande, 1890) gives 3—3½ months for the dried cultures. Park (Med. Record, 1892), seven months for agar culture and four months for membrane. Abel is inclined to believe that in his own example the bacillus had retained its vitality

* Centralblatt für Bakteriologie, Nov., 1893.
† Centralblatt für Bakteriologie, Dec., 1893.

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for six months. He lays stress upon the facts shown by Lœffler, Escherich, Tobiesen, and others, that the diphtheritic bacilli may still be found in the pharynx, even one week after the complete disappearance of the symptoms. He concludes that the greatest care must be taken with the excreta of the mouth and nose, and of everything which may have come in contact with them; the toys which children so often put into their mouths must not be neglected.

Water Filters.—Numerous experiments upon the value of the best filters now in use, namely, the Chamberland-Pasteur and the Berkefeld, have shown that after a certain and variable number of days organisms begin to grow through the walls of the filter. Schöfer* has repeated the experiments and points out the circumstances which favour the growth of the organisms through the filter. He finds that pathogenic microbes, such as typhoid and cholera bacilli, which are added to ordinary tap water, and which, therefore, are not in a suitable medium, do not grow through; if, however, to the water is added a small quantity of artificial culture medium, and if, in addition, the temperature is favourable, then these organisms do pass through. These are self-evident results.

The Presence of the Comma Bacillus in Water Supplies in Spain.—Mendoza† undertook the examination of nineteen sources of water supply in certain provinces in Spain, and found the cholera bacillus in all. He used the usual alkaline, 2 per cent. peptone and 2 per cent. salt broth.

Sterilisation of Water.—A new apparatus is introduced by Laser‡ for boiling water. It is a simple one, constructed by Werner and Siemens. It is introduced because boiling is the only certain method of freeing drinking water from the cholera bacillus. The apparatus furnishes 30 litres of water in one hour; the temperature of the outgoing boiled water is only 5·5°C. above that entering the apparatus; the cost for heating by gas of 1,000 litres of water is put down as nearly two marks. There is room, perhaps, in this country for a similar apparatus, and the subject might be taken up with advantage by some of our manufacturers.

Mixed Infection in Tuberculosis.—The presence of other micro-organisms, in addition to the tubercle bacilli in tuberculosis, is common. The organisms usually present are the staphylococcus aureus and albus and streptococci. Jakowski states that he has obtained both staphylococci and streptococci from the blood (prick of the finger) of patients suffering from phthisis. The statement is one which requires conformation.

The Hereditary Transmission of Immunity.—This is a subject which has received considerable attention recently, and one in which it was thought positive data might be obtained from experiments upon the lower animals. The results have so far been few. Charrin and Gley (Archiv. de Phys., Jan., 1894) made a number of observations for the most part negative. They rendered in the case of rabbits the male immune, and obtained a slight manifestation of immunity in the offspring in one or two cases. The more noticeable feature was, however, the fact that the offspring were weak.

Toxic Properties of Expired Air.—Brown-Séquard and d'Arsonval (Archiv. de Phys., 1894) give further experiments which tend to show that the poisonous properties of expired air depends upon a poison derived from the lungs and not upon the CO_2 exhaled as recently maintained by Haldane and Lorraine Smith.

Vaccination.—Recent papers upon this subject have been published by Copeman upon the bacteriology of lymph and the advantages of the glycerine and other methods of preservation, etc. The immunising properties of calf serum (taken from vaccinated calves) by Kramer and Boyce. A specific micro-organism in vaccinia by Reute and Enoch (Deut. Med. Woch., 1893). A specific protozoon by Guarnieri in Mosso's Archiv. for 1893.

Cholera Cases in London Last Autumn.—From a recent report by Mr. Shirley F. Murphy, it appears that rather more than fifty choleraic cases came under observation in the metropolitan area last autumn, but in only sixteen cases were the circumstances so suspicious as to demand detailed examination. The most startling case of cholera that occurred was that which ended in the death of a cleaner of the House of Commons. It appears that Dr. Klein eventually declared that the death of this woman was unquestionably caused by Asiatic cholera, the appearances being "in every respect most typical" of that disease. The death in Fulham Workhouse was just as certainly, according to his tests, from true cholera; and a sculptor living in Kennington Road, as well as an artisan lodging near Waterloo Bridge Road, died from the same disease not long after. There were other cases where there were germs that "looked like" comma bacilli; but the "cultivations" of them did not yield the results anticipated. It has been noticed in several cases of cholera and choleraic seizures that fish had been eaten shortly before the attack commenced. Dr. Klein, in speaking of Koch's comma bacilli, and the tests used for their discovery, makes the following remark: "Whether cases in which these bacilli cannot be demonstrated by the above tests are or are not cases of true Asiatic cholera cannot in the present state of our knowledge be satisfactorily answered.

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* Centralblatt für Bakteriologie, Nov., 1893.
† *Ibid.* ‡ *Ibid*, Dec., 1893.

LAW REPORTS.

Cases under the Sale of Food and Drugs Acts.

Form of Analysts' Certificate.

The case of "Newby v. Sims," heard on January 17th last in the Queen's Bench Division of the High Court of Justice, decides a question of importance as to the form of an analyst's certificate given under the provisions of the Sale of Food and Drugs Acts, 1875 and 1879.

The point was raised by way of appeal from a decision of the Justices of Durham, dismissing a summons brought by the appellant, the Inspector of Food and Drugs for the Hebburn Local Board of Health, against the respondent in respect of the sale of a sample of rum, contrary to the provisions of the above Acts.

It appears that the respondent was charged before the magistrates with having sold to the prejudice of the appellant, a pint of rum which was not of the nature, substance, and quality of the article demanded by the appellant as such purchaser. The evidence of the adulteration of the sample was contained in the certificate of the analyst, which (so for as is material) was as follows :—

> County of Durham.—Sale of Food and Drugs Act, 1875. —On August 1st, 1893, I received from the inspector a sample of rum for analysis, and I have analysed it and find that the sample contains an excess of water over and above what is allowed by Act of Parliament. I estimate the excess of water at 13 per cent. of the entire sample. I am of opinion that the sample is not a sample of genuine rum.

The Justices were of opinion that the analyst's certificate in the above form, whereby he purported to "estimate" the excess of water at 13 per cent. of the entire sample was not sufficient evidence of the offence charged, although in other parts of the same certificate he used the words "I find" and "I am of opinion," and they therefore dismissed the summons, but consented to state a case on the point for the opinion of the High Court.

The case having been argued before a divisional Court of the Queen's Bench Division, the Judges held that the decision of the magistrates was correct though based on wrong grounds. The Court stated that the true ground on which the certificate was insufficient evidence of the offence charged was that the analyst had taken upon himself to determine what amount of water was allowed by Act of Parliament, though there was nothing on the certificate showing that he knew what the amount was, or referring to the Sale of Food and Drugs Act Amendment Act, 1879, which permits rum to be mixed with water to the extent of 25 degrees under proof.

The Court further stated that the duty of the analyst was to give a quantitative analysis of the sample, leaving the magistrates to determine whether the amount of water was in excess of that allowed by Act of Parliament.

The case is also reported in 10 Times Law Reports, p. 206; 29 Law Journal, p. 43; 38 Solicitors' Journal, p. 202; 96 Law Times, p. 301; and 58 Justice of the Peace, p. 53.

Is Baking Powder an Article of Food?

In the case of "James v. Jones," heard in the Queen's Bench Division on December 18th last, the question arose of whether baking powder is an article of food, or an article used for food, within sections 2 and 3 of the Sale of Food and Drugs Act, 1875.

The case was heard by way of appeal from a decision of the quarter sessions of Glamorgan, affirming a conviction of the appellant by the Justices for selling baking powder containing alum, an ingredient injurious to health.

It appears that the baking powder in question contained 20 per cent. of bicarbonate of soda, 40 per cent. of alum, and 40 per cent. of ground rice, the function of the alum being to liberate the carbonic acid gas contained in the bicarbonate of soda, the ground rice being added merely to keep the other two ingredients in good condition.

It further appears that the alum and bicarbonate of soda in the presence of moisture combine to form hydrate of alumina, which remains in the bread.

The questions for the Court were, first, whether the baking powder was an article of food within the meaning of the Act; and secondly, whether it was sold mixed with an ingredient (namely, alum) injurious to health.

The Court were of opinion that the baking powder was not an article of food within the meaning of the Act, and that neither the sale of it, nor the admixture of it with an article of food, unless such article was intended for sale, was an offence, and they therefore reversed the order of the Court of Quarter Sessions, and quashed the conviction by the magistrates.

The first question having been thus decided in the negative, the Court deemed it unnecessary to deal with the second question raised by the case.

The Court stated that though they held that baking powder was not an article of food, they did not intend to convey it as their opinion that nothing could be deemed to be an article of food unless made up into an eatable or drinkable form, such as flour, butter, salt, mustard, pepper, etc.; for although no one would dream of eating them alone, yet these articles were intended to be consumed by mankind.

The case is also reported in 10 Times Law Reports, p. 208; 38 Solicitors' Journal, p. 208; 29 Law Journal, p. 63; and 58 Justice of the Peace, p. 33.

What Constitutes a Written Warranty?

In the case of "Laidlaw v. Wilson," heard in the Queen's Bench Division of the High Court of Justice on October 27th last, the question arose

as to what constitutes a written warranty under section 25 of the Sale of Food and Drugs Act, 1875.

The section in question provides that if the defendant in any prosecution under the Act proves to the satisfaction of the Justices or Court that he had purchased the article in question as the same in nature, substance, and quality, as that demanded of him by the prosecutor and with a written warranty to that effect, that he had no reason to believe at the time when he sold it that the article was otherwise, and that he sold it in the same state as when he purchased it, he shall be discharged from the prosecution.

It appears that the appellant purchased from the respondent half a pound of lard which, on analysis, was found to contain 7 per cent. of beef fat. A summons was issued by the appellant against the respondent under the Sale of Food and Drugs Act, 1875, in respect of such sale, and at the hearing the respondent proved that he had purchased a quantity of lard of which the sample in question formed part, from a firm named Kilvert and Sons, under a written contract in the following terms: "We have this day sold to you three tons of Kilvert's pure lard," etc., and also that he had sold the lard in the same state in which he had received it, and had no reason to believe that it was otherwise than pure. The respondent relied on this contract as constituting a "written warranty" of the purity of the lard, within the meaning of the above section, and the Justices holding this contention to be correct, dismissed the summons, but consented to state a case for the opinion of the High Court upon the question of law involved in their decision.

On hearing the appeal the Court held that the decision of the Justices was correct, and that the words used in the contract — Kilvert's pure lard — did amount to a warranty, although the word warranty was not actually used.

This case is also reported in Law Reports (1894) 1 Queen's Bench Division, p. 74; 10 Times Law Reports, p. 18; 42 Weekly Reporter, p. 78; 63 Law Journal, p. 35; and 58 Justice of the Peace, p. 58.

A Further Decision on the Question of Written Warranty.

The case of "Elder v. Smithson," heard in the Queen's Bench Division of the High Court of Justice on November 14th, 1893, raised the same question as that decided in the case of Laidlaw v. Wilson, above reported, namely, as to what constitutes a written warranty under section 25 of the Sale of Food and Drugs Act, 1875.

This case also was one arising out of a prosecution for the sale of lard contrary to the provisions of the said Act. On the hearing of the summons before the magistrates the respondent proved that he had purchased the lard in a bladder on which was printed the words, "Pure Star Brand," and the magistrates thereupon decided that the words amounted to a written warranty and dismissed the summons.

On appeal, the Court held that there was no warranty in writing within the Act, as there was no warranty that the article was lard, and they therefore allowed the appeal, and remitted the case to the magistrates with an intimation that they ought to convict.

This case is also reported in 9 Times Law Reports, p. 68; 57 Justice of the Peace, p. 809; and 38 Solicitors' Journal, p. 135.

QUERY COLUMN.

W. R. writes: I shall be much obliged to you if you will inform me as to the inspection of retail bakehouses. As far as I can see the Act does not give the inspectors right of entry. Does "The medical officer of health shall have and exercise all such powers of entry" mean that he can send inspectors?

Answer.—No right of entry into retail bakehouses is given to the sanitary inspector under section 117 of the Factory and Workshop Act, 1883. This omission need not, however, cause any practical difficulty, as the inspector has ample powers under section 116 of the Public Health Act, 1875. This section gives the inspector of nuisances power to visit any place where various substances (bread being specified among other articles) are in process of preparation for the food of man.

Question.—A bakehouse has a water supply from a well, the water of which is condemned by the borough analyst. No evidence of actual injury to health can be proved, but the water is undoubtedly unfit for drinking purposes. Does this condition render the bakehouse insanitary under section 16 of Factory Act, 1883? The landlord is prepared to lay on a good water supply, but the tenant claims under his lease the use of the well, and it is doubtful whether, in the present state of the law, the magistrates would give an order to close the well without evidence of actual injury to health. Have we any other remedy?

Answer.—Whether the water of a well is or is not injurious to health is a question of fact for the justices, but it is not necessary that actual injury to health should be proved if the prosecution show that the water is so polluted as to be injurious to health if consumed. It appears to me that proceedings under section 70 of the Public Health Act, 1875, to close the well should be successful, if the medical officer of health is right in condemning the water. The absence of a proper supply of water probably renders the bakehouse insanitary under section 16 of the Factory Act, 1883, and an order could be made under that section requiring a proper supply of water to be provided, but this is a question of fact also turning upon the evidence as to the quality of the water. Proceedings may also be taken under section 62 of the Public Health Act, 1875, to compel the owner to provide a proper water supply, but neither these proceedings, nor proceedings under section 16 of the Factory Act, 1883, would result in the closing of the well, and the appropriate remedy is, in my opinion, that provided by section 70 of the Public Health Act, 1875.

ANNOTATIONS.

Scurvy in Children.—The severer type of scurvy, which formerly caused a large share of the total deaths in this country, is now almost unknown. In a modified form, scurvy is still, however, not uncommon, more particularly in young children. It is essentially a food disorder, being always associated with a deficient supply of sound, fresh vegetable or animal foods. The experience of children's hospitals appear to show that it has increased during the last fifteen years, an increase which is largely due to the substitution of proprietary preserved infants' foods for fresh cow's or breast milk. The disease would be—according to Cheadle—even more common than it is were it not that the evil effects of such preserved foods are counteracted by giving children at an early age potatos and fruits.

The Prevention of Diphtheria.—That sunlight is inimical to many kinds of bacteria is shown by an increasing number of experimental results, some of the latest of which have been contributed by Ledoux-Lébart ("Arch. de Méd. Expér. et d'Anat. Path.") He finds that direct sunlight will sterilise artificial cultures of the diphtheria (Löffler) bacillus, and that diffused light will also do so if the bacilli are placed in contact with distilled water or spread out as dry cultures in thin layers. The result is only obtained after a few days, and depends almost exclusively on the more refrangible rays of the spectrum. Bacilli in diphtheritic membrane are proof against both sunlight and pure water. Of the various antiseptics used in the treatment and prevention of diphtheria, one of the most useful appears to be *citric acid* in 10 per cent. solution. This was shown by d'Espine, of Geneva, in 1889, and confirmed by Abadie and Babès. Recently Hugo Laser, of Königsberg, has made a series of exhaustive experiments on artificial cultures, diphtheritic membranes produced artificially in guinea-pigs, and diphtheritic throats in the human subject, which show conclusively that citric acid rapidly kills the bacilli and promotes recovery. In bouillon cultures the bacilli are killed in five minutes by 10 per cent. citric acid. Laser prescribes a gargle of weak citric acid to be used every hour, or in the case of very young patients paints the throat with the solution. Internally he gives a teaspoonful or a dessertspoonful of the 10 per cent. solution every hour, according to the age of the child, as well as raw lemons to eat or natural lemonade to drink. The lemons are cut into thin slices, and a slice given at frequent intervals to the child to suck, the pulp being rejected. As much as two lemons may advantageously be given in 24 hours. This treatment is said to be efficacious, while at the same time it is grateful to the patient and absolutely free from danger, and may usefully be adopted for prophylaxis.—*Hyg. Rundschau.*

Small-pox by Post.—Mr. Karkeek, the medical officer of health for Torquay, gives the following interesting case in his last annual report:—In April last a young man was admitted to the small-pox hospital of a large town. Two days previously he had left Torquay, and on making inquiries at the house where he had there lived, everyone was found in perfect health. It appeared, however, that the patient was engaged to be married to a nurse in a hospital in a large manufacturing town in Yorkshire. The nurse had been attending on small-pox patients, and had during this time kept up a correspondence with her sweetheart. A friend had suggested that the correspondence was not unattended with risk; but he had replied that the letters were all disinfected before being posted. Strange to say, the last case of small-pox in Torquay, in March, 1884, was imported under almost precisely similar circumstances.

Cholera: Retrospect and Prospect.—Dr. Shadwell, the cholera superintendent of the Metropolitan Asylums Board, makes the following remarks in a recent report: Regarded as a whole the European visitation of cholera in 1893 presented one very encouraging feature. Although spread over an exceedingly large area, it occasioned comparatively little mortality. That this should be the case where it was so destructive in the previous year was only to be expected, for cholera was seldom bad in the same place two years running; but we should naturally have anticipated greater mortality in the countries that escaped in 1892, such as Italy, Spain, the south of France, and Turkey. That the fortunate result, both there and at home, was in some measure due to increased knowledge and improved sanitary conditions might be reasonably believed; but it was difficult to help thinking that the exceptionally dry season had more to do with it. And in this connection it was worthy of note that almost all the cases of cholera in England occurred in that part of the country which was least affected by the drought. Cholera was still "in the wind," and next summer we might expect with some confidence to witness a revival of the disease in Europe.

The Local Government Board and Notification Certificates.—The following letter from the Secretary of the Local Government Board gives official expression to the views of the Board as to medical officers of health verifying diagnoses made by private practitioners: "Local Government Board, Whitehall, S.W., February 2nd, 1894. —Sir,—I am directed by the Local Government Board to advert to your letter of December 28th last, with reference to the representations which have been made by Dr. ——, as to the action of the medical officer of health for the ——— in visiting certain of his patients. As regards the general question of the medical officer of health's

duties in connection with cases of infectious disease, I am to state that the Infectious Diseases (Notification) Act, 1889, makes no difference in those duties, but merely extends his information as to the existence of cases of infectious disease. His duties as regards such cases are prescribed by Article 18 (6) of the Board's order of March 23rd, 1891, of which a copy is enclosed. It appears to the Board to be undesirable that the medical officer of health should in general undertake a personal diagnosis of the notified cases in order to test the accuracy of the certificates. In some cases, as where there is reason to doubt the good faith of the certifier, or where the disease is one which in itself is, or owing to the attendant circumstances threatens exceptional danger to the community, it may be desirable that the medical officer should make a personal diagnosis, but it must be remembered that this can only be done with the consent of the patient, or those having charge of the patient, and that the medical practitioner in charge of the case should always be communicated with, and his co-operation secured, if possible."

OBITUARY.

PROFESSOR AUGUST HIRSCH.—The death of Dr. Hirsch removes the most distinguished expert, we might almost say the founder, of the study of the geographical distribution of disease. Born in Dantzic in 1817, the deceased practised as a general practitioner in his native town for seventeen years. During that period he made extensive researches into the history and geographical distribution of malarial fever, typhoidal maladies, dysentery, and allied diseases, and embodied his conclusions in his well-known "Handbook of Historico-Geographical Pathology," the first volume of which was published in 1859, and the second in 1864. The book marks an epoch in the history of medicine. In 1863 he was appointed Professor of Medicine at Berlin University, where he lectured on the history of empiricism and other special subjects, besides holding courses in pathology and therapeutics. In the winter of 1863 he was delegated by the Government to inquire into the outbreak of cerebro-spinal meningitis, then prevalent in an epidemic form in West Prussia, and published a book on the subject. In the Franco-Prussian War Professor Hirsch had charge of an ambulance. In 1873 he was a member of the German Imperial Cholera Commission, the appointment of which was largely due to his initiative, and in the following year he represented Germany at the International Sanitary Conference of Vienna. In 1879 he went to Astrakhan to study the outbreak of the plague in that province, and compiled an elaborate report on the disease. Among the many works on special subjects written by the deceased was a history of the epidemics of the Middle Ages and an important textbook on diseases of the eye.

REVIEWS

A Treatise on Hygiene and Public Health. Edited by THOS. STEVENSON, M.D., F.R.C.P., and SHIRLEY F. MURPHY, M.R.C.S. In Three Volumes. Vol. II., price 32s. (J. and A. Churchill.)

There are two ways in which a composite treatise like the above may be edited. One is to carefully remove from the articles all statements by different contributors which are irreconcileable or contradictory, and to delete any redundant statements of fact. The other is to allow each author freedom of expression of his own views, even when "these are not in complete harmony with those of other contributors, or of the editors themselves." The former method secures homogenuity and continuity of statement, and prevents repetition; the latter secures to each article the individual stamp of its author, while at the same it gives to the entire treatise the appearance of being a number of treatises simply bound together for convenience. We are fain to admit that the latter is the only practicable method in so wide and complex a subject as public health; and this being so, the editors may be congratulated on the names of the contributors to this ponderous second volume, which are sufficient guarantee of the value of their respective articles.

The first article on "The Pathology and Etiology of Infectious Diseases" is by Dr. Klein. It occupies 240 out of the total 847 pages of this volume, and the forty-two full-page plates which form an appendix to it bring it up to about two-fifths of the entire volume. These plates are many of them exquisitely coloured; they are all beautifully executed, and if we mistake not will be largely used by teachers for bacteriological demonstrations and for comparison with actual microscopical, test-tube, plate, or other preparations.

Dr. Klein's treatment of his subject is full and exhaustive. The characters of bacteria, the conditions and mode of their multiplication, the methods of studying their morphology and their biological characters, form the subjects of introductory chapters. Then follows a very complete chapter on their relation to animal tissues, in which the problems of phagocytosis and immunity are discussed. It need hardly be said that Dr. Klein comes to the conclusion that phagocytosis, if it occurs at all (as it certainly does in some instances), has but a secondary influence, the essential agent in preventing the growth and multiplication of specific microbes within the insusceptible animal being the inimical action of the lymph and blood plasma, the alexines. The bacterioscopic methods of examining water, air, etc., are somewhat scantily described in Chapter VIII. Chapter X., on the manner of infection or contagion is extremely well written. It presents a masterly summary of our present knowledge of the subject. The second section of this contribution deals with special pathogenic microbes. It will be of great interest to all medical officers of health. Not the least value of this portion of Dr. Klein's article is that it focusses all the experimental research on the various infective diseases up to the time of writing. Instead of requiring to refer to foreign periodicals or to the almost equally inaccessible back numbers of the annual reports of the medical officer to the Local Government Board, we have here stated in brief (comparatively) the results of these important investigations. It need hardly be said that the many debateable points are stated from what, for want of a better name, we may style the Kleinian standpoint; but the pros and cons are always fairly stated, so that each reader may judge for himself on which side lies the balance of evidence. The only apparent exception to this statement is in the case of the Hendon outbreak, where the statement made by Professor Axe, Dr. Thin, and Dr. Crookshank that a boy, himself supposed to be free of the disease, was the human means by which infection was conveyed to the Hendon milk, is denied by a simple categorical statement that "no such boy could have infected the milk." In view of the conflicting evidence in this case, we believe that the majority of hygienists still keep an open mind and wait for a number of cases in which the human origin of the scarlatinal infection has been rigidly excluded before regarding it as proved that

a peculiar affection of the cow may be the cause of human scarlet fever.

The next chapter is an exhaustive account of the pathology of diphtheria. The statement in this chapter that the contagion of diphtheria belongs to the group called *fixed contagia* is open to misinterpretation of some practical consequence, unless the remarks in a much earlier chapter (p. 76) showing how illusory is the distinction between fixed and miasmatic contagia be read in the same connection.

One naturally looks with interest to the chapter on cholera to ascertain whether any modification of the author's views on the comma spirillum is manifested. On p. 175 it is admitted, as shown by cultural experiments, that the comma bacilli found in cholera all belong to the same species. Their well-defined appearances on cultivation in nutrient gelatine, together with their morphological characters, render "their demonstration by cultivation in the evacuations of diagnostic value." As the experience of last summer has, however, shown, and as Dr. Klein here points out, "in some early cases, or in non-typical cases, their demonstration by the culture test, owing to the vast predominance of other bacteria, is a matter of some difficulty." The etiological relationship between the comma bacilli and cholera is apparently left an open question, though Dr. Klein states that "since the comma bacilli are capable of producing toxins, it follows that when they have an opportunity of multiplying sufficiently they produce a sufficient amount of the toxic substance cadaverine, and thereby are capable of producing acute poisoning."

Dr. Klein's views on heredity have the virtue of simplicity. "Heredity of disease," he says, "always means—and can only mean—the transmission of the disease germ directly from the parent to the offspring." He disdains any such figment as inherited *vulnerability*, and prefers the view that in cases of this kind the disease germs acquired *in utero* have lain dormant, perhaps for ten or twenty years. He coins out of the same dogmatic views on heredity an argument in favour of the theory that cancer should be placed among the infectious or communicable diseases. "That cancer is hereditary needs no further comment, and, like other infectious diseases, is probably of the nature of infectious disorders."

We conclude our review of Dr. Klein's most valuable and complete contribution with a complaint. A wilderness of pages of closely-packed type is traversed, with scarcely a variation of type or sub-heading, and not a single marginal reference of any description. This is not fair to the student. His work is much increased by an omission that might easily have been supplied. Should the editors and publishers decide to publish Dr. Klein's article (with the practical improvement just suggested) in a separate book, it would, we think, at once take its place as the most authoritative English text book on bacteriology.

The second article is on "The Natural History of Infectious Diseases," and is contributed by Mr. T. W. Thompson, of the Medical Department of the Local Government Board. Mr. Thompson has the pen of a ready and elegant writer, and his article is the most readable in the volume. It gives full and accurate information on the natural history of each infectious disease. After a careful perusal, we have not been able to detect the omission of any important point. The remarks on Rötheln as a hybrid disease are judicious. German measles, as Goodhart points out, is a much-abused term which is frequently pressed into the service as a cloak to difficulty of diagnosis. The average case mortality in hospital practice of scarlet fever is stated to be about 10 per cent. If the Metropolitan Asylums hospitals are omitted, it is probably nearer 5 per cent. We doubt if the statement that the majority of cases of enteric fever are due to specifically contaminated water or milk will coincide with the daily experience of the majority of health officers. The majority of large epidemics are thus caused, but the total number of cases claiming this origin probably does not bulk so largely as the number in which local insanitary conditions (without any history of a previous case) are the only ascribable cause, and in which the theory of origin *de novo* is only avoided by the assumption that the enteric fever organisms may thrive for a long time in the soil.

The analogy between diarrhœa and cholera is well worked out by the author, the view being apparently taken that cholera may after all be but an Asiatic variety of a disease known elsewhere as diarrhœa and cholera nostras. It is true that diarrhœa in this country does not often owe its reputed origin to contaminated water supply, but it is equally true that, unless the experience of Anglo-Indian doctors is to be taken as unauthoritative, water infection is not so prominent a cause of cholera in India as in this country. The warning that the immunity from cholera of this country since 1866, judging by the analogy of influenza, need not necessarily be continued is timely.

Dr. J. C. McVail is the author of the article on "Small-pox and Vaccination," and those who know his able work, "Vaccination Vindicated," will not be surprised at the lucid and complete statement of all the facts of the case in the present article.

The section on "Vital Statistics," by Dr. A. Ransome, is somewhat disappointingly meagre. Dr. Ransome has himself made such important personal researches in this branch of public health that perhaps expectation was inordinately raised. It need hardly be said that what is given is accurate and clear.

Dr. H. E. Armstrong has contributed an elaborate and exhaustive article on "Marine Hygiene," the value of which is enhanced by an excellent bibliography, and by numerous illustrations.

"Military Hygiene" is the subject of Professor Lane Notter's contribution, which comprises *inter alia* an interesting account of the effect of the Contagious Diseases Act on the prevalence of venereal diseases.

The names of Sir Spencer Wells and Mr. F. W. Lowndes will indicate the nature and scope of the two articles on "The Disposal of the Dead."

The last article on "The Medical Officer of Health," by Dr. A. Ashby, necessarily encroaches to a certain extent on the subject (Sanitary Law) of the third and forthcoming volume of this treatise. This is, however, only a minor disadvantage, which necessarily recurs in nearly every article. Dr. Ashby's article is one which may be read with advantage by all health officers. It is full of suggestive and useful information.

It is impossible in the space at our disposal to thoroughly discharge our present duty of criticism and review in relation to this important volume. Enough has, however, been said to indicate that the work is one which every hygienist will find it advantageous if not actually necessary to have by him for reference and consultation.

Scarlatina and Scarlatinal Sore Throat: A Record of Milk Infection. By ARCH. K. CHAMBERS, M.D., D.P.H., one of the Medical Officers of Health for the City of Glasgow. (Printed by R. Anderson, 22, Ann Street, Glasgow.)

This pamphlet contains a careful record of an outbreak of scarlet fever in December, 1893, in the north-western district of Glasgow, connected with infected milk supplied from two dairy farms, A and B. Of 80 families supplied from these sources, 11 (or 13·7 per cent.) contracted scarlet fever, yielding 18 cases. On visiting the two farms, several cases of sore throat were discovered. The more suspicious of these were isolated and watched. They showed scarlatinal appearances in the throat, but no desquamation occurred. The scarlatinal character of these sore throats was confirmed by the later occurrence of an undoubted case of scarlet fever in the person of a byreman at farm A. The outbreak ceased when the milk supply was cut off. There was no suspicious affection of the cows on the two farms. The contamination of the milk was evidently in small quantities, such as might happen were the individual milk-carrier the source of infection.

As pointed out by Dr. Chambers, two aspects of the outbreak are of great importance:—

"One is the responsibility of the milk purveyor for the

health of his employés. This has been frequently pointed out in the past, but the farmer has not yet accepted the teaching. It is a matter of common acceptance that infectious disease has often gained access to the source of a milk supply under the simple guise of a 'common cold'; the rude awakening which follows may mean commercial disaster to the farmer. The relationship of infectious disease to a milk supply is of an extremely delicate character, and the plain duty of the farmer is to allow no one with symptoms of illness, however apparently trivial, to have anything to do with his milk trade while the symptoms continue, or until they are clearly not of such a character as, to a trained observer, would suggest the possibility of infection.

"The second aspect of this outbreak is primarily of a medical character. It is a feature of all outbreaks of infectious disease that along the stream of well-defined and easily recognisable cases there extends a margin of less defined cases, diminishing in intensity and definition, until it is only by association that many are recognisably related to the main current. Cholera has its fringe in cases of diarrhœa of diminishing intensity, until finally it is lost in apparently simple diarrhœas. So also has enteric fever; and we have, in this city, just passed through a similar experience in regard to the eruption of small-pox. The margin of a scarlet fever epidemic consists of cases of associated sore throat, and reference has already been made to the unusually large proportion of these which occurred in the consumers of the milk under discussion.

"How are these vanishing points of infection related to the cases which are easily recognisable? They are due to the same cause, and for at least the time of their duration must be held to be capable of a certain power of infection, but they do not come within even a liberal reading of any clinical description of cholera, or enteric fever, or scarlet fever, and consequently escape notification. In some instances in connection with the disease last named later symptoms may indicate their true character, but such are always open to the suspicion that this might have been recognised by continuous observation at the beginning."

The Local Government Annual. An Official Handbook, 1894. (S. EGECUMBER-ROGERS, Dorset Street, W.C.) 1s. 6d.

This is a serviceable and complete guide which will be useful to all requiring a list of local and central authorities for ready reference. In addition to a complete list of urban and rural sanitary authorities and of burial boards, there is a list of central governing bodies, and other useful information. We should have preferred to have the advertisements at each end of the book instead of being interpolated throughout.

RECOGNITION OF HORSEFLESH.—A new method has been recently recommended by Brautigam and Edelmann which is applicable both to cooked and uncooked flesh, or even to broth made from a mixture of horseflesh and ordinary meat. It depends on the relative richness of horseflesh in glycogen. Broth from the suspected meat is mixed when cold with dilute nitric acid, filtered and tested with hot saturated solution of iodine gently let down upon it. If made from horseflesh, a ring of colour varying from Burgundy red to violet will appear at the junction of the two liquids. If this test fails, a strong solution should be made from the meat by soaking with caustic potash, concentrated and filtered, the iodine test being then reapplied. As little as 5 per cent. horseflesh will give the reaction, even after cooking. According to Jungers, the shape of the fat cells is characteristic in horseflesh.—*Hyg. Rundschau.*

APPOINTMENTS.

MEDICAL OFFICERS OF HEALTH.

BARNES, GEO., L.R.C.P.Edin., M.R.C.S., re-appointed M.O.H. for the Chard U.S.D., Axminster Union.

BRERETON, J. G., L.R.C.P. and S.Irel., appointed M.O.H for the Ryde District of the Isle of Wight.

BURTON, R. G., M.D.Edin., re-appointed M.O.H. for Hanwell, Middlesex.

DODSWORTH, F. C., L.R.C.P.Lond., M.R.C.S., re-appointed M.O.H. for Chiswick, Middlesex.

GRACE, HENRY, L.R.C.P.Lond., re-appointed M.O.H. for Kingswood.

GUTTERIDGE, E. P., M.R.C.S., re-appointed M.O.H. for the Urban and Port Districts, Maldon.

HOPE, E. W., M.D.Edin., D.Sc.P.H., M.O.H. for the City and Port of Liverpool.

MACKINTOSH, A., M.D.Glas., re-appointed M.O.H. to the Clay Cross Local Board.

NEWBY, THOS., M.D.St. And., M.R.C.S., re-appointed Port Medical Officer of the Grimsby Town Council.

NIVEN, JAS., M.A.Aberd., M.A.Camb., M.B., appointed M.O.H. for the City of Manchester.

PEARCE, ARTHUR, M.R.C.S., re-appointed M.O.H. for the Kingsbridge and Salcombe Port.

ROBERTSHAW, WALTER M., M.B., C.M.Edin., appointed M.O.H. to the Stockbridge Local Board, Yorks.

ROBERTSON, J. H., M.B., M.S.Edin., appointed M.O.H. for the Bishops and Tunstall S.D.

SAWYER, J. A. F., L.R.C.P. and S.I., re-appointed M.O.H. for Clevedon.

STREETER, F. E., M.R.C.S., D.P.H., R.C.S.I., appointed M.O.H. to the New Swindon Local Board.

THOMAS, A. W., L.R.C.P. and S.Edin., re-appointed M.O.H. for the Swaffham U.S.D.

WILSON, HENRY B., M.R.C.S.Eng., appointed Health Officer to the Shire of Frankston and Hastings, Victoria, Australia.

OTHER APPOINTMENTS.

WHITELEGGE, B. A., M.D.Lond., D.P.H., etc., appointed Chief Sanitary Officer to the Joint Committee of the West Riding Rivers Conservancy.

DENTAL HYGIENE.—A recent examination by Mr. Denison Pedley, L.D.S., etc., of the 661 boys in the Industrial School, Feltham, Middlesex, reveals some striking facts. It appears, according to the medical officer's statement, that during the year 1892, 135 boys were admitted to the infirmary for dyspepsia alone. One chief cause of this is revealed by Mr. Denison Pedley's investigation. More than three-fourths of the children have decayed teeth, confirming the result of previous observations by Mr. Pedley at the large pauper schools of Sutton, Hanwell, and Southall. This widespread caries indicates the necessity for the appointment of dental surgeons at all our large industrial schools. The absence of such dental surgeons renders regular supervision of the children's teeth and the application of the requisite treatment impracticable, and thus seriously handicaps the children in their future life.

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Medical Officers of Health and other Correspondents are requested to send regularly all published reports and matters of interest bearing upon Sanitation to the Editor, 11, *Gloucester Place, Brighton.*

NOTICE.

THE INCORPORATED SOCIETY OF MEDICAL OFFICERS OF HEALTH.

20, Hanover Square, London, W., March, 1894.

NOTICE is hereby given that an ORDINARY MEETING of the SOCIETY will be held at No. 20, HANOVER SQUARE, W., on MONDAY, the 16th day of APRIL, 1894, at 7.30 p.m., for the transaction of the undermentioned business:—

AGENDA.

1. Minutes.
2. Report of Council.
3. To Elect Candidates. The following candidates have been duly nominated for election:—

As Fellows—

JOHN COWPER, M.B., C.M., Havelock House, Shanklin, Isle of Wight, M.O.H. Shanklin; proposed by G. DABBS, seconded by W. H. CORFIELD.

THOMAS JOHNSTONE, M.D., Annandale, Ilkley, M.O.H. Ilkley; proposed by B. A. WHITELEGGE, seconded by J. W. MASON.

As Members—

WALTER DOWSON, M.D., M.A., D.P.H., 40, Prince Street, Bristol; proposed by JOHN C. HEAVEN, seconded by S. R. LOVETT.

JOHN THOMPSON WILSON, M.B., C.M., D.P.H., 24, Oak Street, Shrewsbury; proposed by S. R. LOVETT, seconded by F. P. WIGHTWICK.

As Associates—

WALTER HYDE, Solicitor, Town Clerk, Boro' of Stockport, Cromwell House, Heaton Chapel, Stockport; proposed by CHARLES PORTER, seconded by FRANCIS VACHER.

GEORGE REDMAYNE MURRAY, B.A., M.B., M.R.C.P., 2, Saville Place, Newcastle-on-Tyne; proposed by T EUSTACE HILL, seconded by JOHN C. THRESH.

4. Nomination of Candidates.
5. Correspondence.
6. Miscellaneous business.
7. At 8 o'clock, a Discussion will take place on "THE TRAINING AND QUALIFICATION OF MEDICAL OFFICERS OF HEALTH," introduced by Dr. A. Ransome, F.R.S., Dr. J. F. J. Sykes, Dr. Louis Parkes, and Dr. H. Manley.

F. P. WIGHTWICK, 55, Upper Brook St., Grosvenor Sq., W.
J. C. THRESH, The Limes, Chelmsford.
Hon. Secs.

PROCEEDINGS OF THE INCORPORATED SOCIETY OF MEDICAL OFFICERS OF HEALTH.

A MEETING of the Incorporated Society of Medical Officers of Health was held at No. 20, Hanover Square, on Monday, March 19th, 1894. Present: The President (Dr. W. T. G. Woodforde) in the chair, Drs. Seaton, S. R. Lovett, T. Eustace Hill, A. Bostock Hill, Willoughby, Sidney Davis, H. R. Kenwood, Braga, Yarrow, Leonard Wilde, and John C. Thresh; Dr. Farquharson, M.P., and Mr. Noel Humphreys were also present.

The minutes of the last meeting of the Society on February 19th, 1894, were read, approved, and signed by the Chairman.

REPORT OF THE COUNCIL.

The HON. SECRETARY read the report of the Council, as follows:—

Your Council have to report that as the result of the Conference at the Local Government Board as to the desirability of the formation of a Conjoint Board for the Examination of Sanitary Inspectors, at the suggestion of Sir Walter Foster, M.P., a Committee, consisting of two representatives of the Sanitary Institute and one representative of every other society attending the Conference, has been formed, and your Council have appointed Dr. T. Orme Dudfield to represent the Society on such Committee.

Resolved, on the motion of Dr. LOVETT, seconded by Dr. BOSTOCK HILL, that the same be received and adopted.

Election of Fellows, etc.—The following gentlemen having been duly nominated for election, a ballot was taken, and they were declared by the CHAIRMAN to be unanimously elected.

As Fellows—

L. W. DARRA MAIR, M.D., 25, Dingwall Road, Croydon, M.O H. Croydon R.S.D.

JOHN ALFX. HEDGES, Rutland House, Leighton Buzzard, M.O.H. Leighton Buzzard U.S.D.

EDWARD H. W. SWETE, M.D., D P.H., Fort Royal, Worcester, M.O.H. Droitwich R.D.

HENRY WISKEN, L.R.C.P Edin., L.F.P.S.Glas., Hazelthorpe, Heywood, M.O.H. Heywood Ml. Borough.

ABRAM THOMPSON, M.D., M.R.C.S., Lightburne, Ulverston, M.O.H. Ulverston U. and R.S.D.

GEORGE HALL, M D. and C.M.Edin., Milford, Godalming, Surrey, M.O.H. Hambledon R.S.D.

GEORGE FREDERICK PHILLPOT, L.R.C.P., Ceely House, Aylesbury, Bucks, M.O.H. Aylesbury R.S.A.

GEO. WM. SIDEBOTHAM, M.R.C.S., L.S.A., 34, Church Street, Hyde, M.O.H. Borough of Hyde U.S.D.

ROBERT N. DENNING, B.A., M.D., L.R.C.P.I., L.M., Elland, Yorkshire, M.O.H. Elland U.S.D.

G. HODGSON HIGGINS, M.R.C.S.E., L.R.C.P., 1, Brighton Terrace, Heckmondwike, M.O.H. Cleckheaton R.S.D.

As Member—

EDWARD H. EZARD, M.D., D.Sc Edin., 220, Lewisham High Road, S.E.

As Associate—

THOMAS DE COURCY MEADE, Mem. Inst. Civil Engineers, Belmont, Muswell Hill, London, N., Engineer and Surveyor, Hornsey Local Board.

NOMINATIONS.

A number of candidates were then nominated for election at the next meeting.

DEATH CERTIFICATION AND REGISTRATION.

The HON. SECRETARY read letters of apology for non-attendance from Dr. Newsholme, Dr. Mumby, Dr. Jones, and Dr. Lowndes, and the following communication from Sir Henry Thompson :—

Hotel Metropole, Cannes, France,
March 11th, 1894.

DEAR SIR,—I am extremely sorry that my temporary residence here renders it impossible for me to be present at the meeting to discuss "Death Certification, etc.," on Monday, the 19th inst. I take a deep interest in the subject, and my views are set forth at considerable length in the Blue Book recently published reporting the proceedings of the House of Commons Committee thereon. Among many things there is a copy of the certificate that we have been using for the purposes of "the Cremation Society." I venture to think it a useful formula, and I will undertake to send you one from the Cremation Society before that date. I find it brings me excellent answers, a dozen or so of which I sent to the Chairman of the Committee, Sir Walter Foster, as a specimen of the reports which reached us. In the summary of the Committee's observations on the evidence the proceedings of the Cremation Society in relation to this matter are spoken of with remarkable approval. I have long kept this subject before our Council, for years past pressing upon them the importance of our promoting reform in this matter, and of not pushing forward the subject of cremation too rapidly until we get a far better system of certification and examination after death than at present exists.—I am, etc., HENRY THOMPSON.

John C. Thresh, Esq.

The following paper, written by Dr. Lowndes, of Liverpool, was, in his unavoidable absence, read by the HON. SECRETARY (Dr. Thresh).

DEATH CERTIFICATION.

By FREDERICK W. LOWNDES, M.R.C.S.Eng.,
Surgeon to the Liverpool Police and to the Liverpool Lock Hospital.

Having a great deal to say upon the important subject of death certification, and only a very limited time in which to say it, I must ask you to assume the importance of this subject, the desirability of keeping before the Government, the profession, and the public the recommendations of the Select Committee of the House of Commons appointed to inquire into this matter last year, and at once plunge *in medias res*.

And first let me ask you to keep in your hands the sheet appended to this paper which I have prepared, giving extracts from the committee's report, together with sections and sub-sections of the Registration and Coroners Acts, and a proposed form of death certificate. This will save much time and wearisome repetition.

You will see that the committee's first recommendation is that no death shall be registered without being certified either by a registered medical practitioner or by a coroner after inquest. As you are aware, the practice of coroners is by no means uniform, nor is that of registrars of deaths. In Liverpool for many years past the practice has been for the latter to refer to the coroner every death which is not medically certified. The coroner does not, however, hold inquests in all these cases, but makes informal inquiries into these and other uncertified deaths referred to him; these informal inquiries equalling and even exceeding the total number of inquests, which average 800 to 900 yearly. When he considers an inquest unnecessary he sends the registrar a printed form, supplied by the Registrar General, and duly filled up, giving all the particulars requisite for the registration of the death, together with the statement that he considers an inquest unnecessary, and giving the probable cause of death. While the Registrar-General sanctions this proceeding by giving these forms he classes these deaths as uncertified. Probably the practice in some other large centres of population is similar to that in Liverpool; in others it is very different, many deaths being registered without medical certificate or reference to coroner. While it is satisfactory to know that a large proportion of these so-called uncertified deaths are not absolutely so, having been inquired into by coroners (some of whom are members of our profession), these informal inquiries, ending in such a negative result, cannot be regarded as a thing desirable to perpetuate; and it is clear that the committee were of opinion that if the coroner did not certify after inquest, he had better not certify at all.

You will see that in their next recommendation they proposed to amend this anomalous state of matters by the appointment in each sanitary district of a public medical certifier of the cause of death in cases where no medical certificate was forthcoming. And in the body of their report (page 12) they express an opinion that the medical officer of health for each district should discharge this duty, employing a deputy when necessary. When giving evidence I was pressed very strongly on this point. My opinion was then, and is now, that our aim should be to improve the present system, with strict justice to all those members of the profession whose aid is required in ensuring a more perfect system of death registration. For it does not follow that because a death was uncertified that therefore there was no medical attendance, since many deaths are reported to coroners and the police by the medical attendants, who have felt bound to refuse a certificate. Or again, medical practitioners are frequently called to see persons found dead; some few have given certificates, but the majority would decline to do so. In either of these cases it appears to me that it would be manifestly unfair to ignore the medical attendant or the practitioner who first saw the body after death. What is the main cause of the deficiencies of the present system? I have no hesitation in giving as my answer the careless drafting of the 2nd sub-section of the 20th section of the Births and Deaths Registration Act, 1874. When it was framed, the Act which it purposed to amend had been in force since 1837. Death certificates, though not actually compulsory, were practically so, and the refusal to give one was recognised as implying that further inquiry was needed, or even an inquest. This Act of 1874 made death certificates compulsory, as you will see by reference to the sub-section 2. It must have been drafted by someone very ignorant of its practical working. For, as you will observe, the refusal of a certificate is not alluded to at all, though the obligation to do so is as imperative in certain cases as it is to give one in others. Moreover, the wording is absolute. In every case which a medical practitioner has attended during the last illness he *shall* give a certificate. The only suggestion of refusal is that implied in section 39, which imposes a penalty for refusal in such cases where this is done without reasonable excuse, a very negative and unsatisfactory mode of sanctioning refusal. Can we be surprised that certificates have been given improperly by inexperienced practitioners under such circumstances. The Select Committee on this point observe: "Your Committee concur in the opinion that it is desirable to define as precisely as may be possible the circumstances in which a medical man in attendance on a case should not give a certificate of death, and it appears to them to be proper that he should not do so in any case in which he is unable to certify that the death is due to disease. In all cases in which he does certify he should include in his certificate a statement pointing to the absence of accident, poison, violence, or criminal neglect." This you will see is rendered necessary by the Coroners Act of 1887, which requires the coroner to inquire into any death the result of violence, however remote, any unnatural death, or sudden death, the cause of which is unknown; and it is obviously undesirable that two Acts of Parliament should antagonise one another. You will see that the sub-section of the Act referred to would be perfect if it were limited to cases of purely natural death, and in which there was no other reason why a certificate should not be given. A few words of amendment would suffice to make it applicable to all such cases. The 3rd sub-section must be considered as applying to all those cases in which an inquest follows a death as a matter of course—homicides, suicides, accidents, etc.—in which a certificate is not asked for. Thus, two large classes of deaths are disposed of: (1) cases in which a certificate ought to be given; (2) cases in which an inquest must be held.

But as I need hardly urge before such a meeting as this, there is a third and very large class of cases to be dealt with, what we may call intermediate or doubtful cases. These are cases attended by medical practitioners, in which the border line between a natural death on the one hand, and an unnatural or violent death on the other, is somewhat sharply drawn. Let me give a few instances.

(*a*) A boy in full health is taken ill rather suddenly, and dies soon afterwards from meningitis, the result as transpires from rough play at school.

(*b*) An adult of either sex dies after a short attack of gastro-enteritis which may be natural, but which may also be the result of improper food, or even poison.

(*c*) A man dies from heart disease or chronic bronchitis, after a friendly wrestle with some companion, and other instances might be multiplied.

Ought the medical attendant in each and all such cases to refuse a certificate, and to refer the case to the coroner? This course will subject him to much annoyance, and the probable loss of a good family connection. But does the responsibility of the doubt rest with the medical attendant or with the coroner? How is the latter to be informed of unnatural or violent deaths except from the medical attendant? My own opinion is that medical practitioners should be relieved from the invidious position in which such cases place them by a new sub-section in the Act of 1874, such as this: "Provided always that should the death have been an unnatural one, a sudden one, the cause of which is unknown, or the result, however remote, of violence, or should the medical practitioner who has been in attendance during the last illness have any reasonable doubt as to the propriety of giving a certificate of the cause of death, he shall refuse to

do so, and shall refer the case to the coroner for the district in which the dead body is lying."

I cannot help fearing that the proposed appointment of medical certifiers would not meet this difficulty of doubtful or uncertified deaths. Our present system of registering deaths works fairly well so far as perfectly natural deaths and deaths after inquests are concerned. The cases to be dealt with are the doubtful ones and those in which there has been no medical attendant. These latter, as we learn from the Select Committee's report, and from our own knowledge, are mostly those of infants dying shortly after birth, their mothers having been attended by midwives; and of elderly people who have died from decay of nature or other natural cause without medical attendance at the time of death. Now, as I have already noticed, in a large number of these cases a doctor is called in too late to certify but not too late to give useful information to the coroner; and it appears to me only right to follow in the line of the Medical Witnesses Act of 1836, and the Coroners' Act of 1887, and to respect the rights of all medical practitioners, especially of those who practise among the working classes. The Committee recommended that medical certificates should be paid for and suggested a fee of half-a-crown, also requiring that each death should be verified by an inspection of the body. While I wish that the fee could be more, I cannot ignore that this one would involve an annual expense on an average of 550,000 deaths of £60,000 to £70,000 a-year. That every death should be properly verified is manifest, since at present without this the death certificate is worthless, and registrations are more or less of a farce. Passing on to the next two suggestions of the Committee, I will now ask you to look at the form of certificate which I have sketched out. You will see that I purpose adding the word "alive" or "living" after the words "I last saw him or her." Though most of us would consider "attendance" as ceasing with life, I have heard even most respectable and scrupulous practitioners maintain that going to a house and seeing the dead body is attendance within the meaning of the word in the certificate. Hence the addition of the word alive or living seems to me to be necessary. The Committee consider that "attendance during last illness" should be defined as meaning personal attendance by the person certifying upon at least two occasions, one of which shou'd be within eight days of death. I have also added the words "that I saw and identified the body on the ——." This can be done in a very large number of deaths with little or no trouble, in hospitals, asylums, workhouses, public institutions, and whenever a post-mortem is made. In another class of cases there would be more difficulty, but in none would there be any insuperable difficulty. You will see that my proposed certificate ends in a flap, which I would have gummed so that it could be fastened up after being duly filled in by the medical attendant, and handed to the person applying for it. I see great difficulty in the way of sending it direct to the registrar, and I feel sure that you will agree with me. And we shall also agree with the fifth recommendation of the Committee, that a form of certificate should be prescribed and that no other should be used. I give you my suggested form, and hope that you will revise and improve it, as I feel sure that you can do.

It was suggested by two of the medical witnesses who gave evidence before the Committee that the police surgeons should be the medical certifiers. Though a police surgeon myself, I did not make the suggestion, and though such an arrangement has some points of recommendation, and might work fairly well in certain districts, I can foresee many difficulties in the way. Medical officers of health having to exercise an official scrutiny over the returns of deaths, it seems to me that for them to act as certifiers would be incompatible with their other duties. Police surgeons having to perform medico-legal duties would often be placed in a very invidious position.

Without wishing in any way to limit your discussion, I would suggest the following points :—

1. That recommendations Nos. 1, 3, and 5 of the Select Committee on Death Certification ought to be adopted, and embodied in any future legislation on death certification.

2. That every uncertified death should be reported to the coroner of the district in which the body is lying. That he shall have authority to call for the assistance of the medical practitioner who has attended the deceased in the last illness, or was the first medical practitioner to see the body after death took place, or any other medical practitioner residing in the neighbourhood. And that the coroner shall have power to remunerate such medical practitioner should there be no inquest.

3. That the 2nd sub-section of section 20 of the Births and Deaths Registration Act of 1874 should be amended, so as to specify those cases in which a certificate ought to be refused.

4. That the 2nd and 4th recommendations of the Select Committee are not practicable.

5. That deaths should be certified in three modes (1) Natural deaths by registered medical practitioners, after attendance during life and verification after death; (2) Violent or unnatural deaths by coroners after inquest; (3) Doubtful deaths by coroners, aided by medical practitioners, after informal inquiry.

6. That every medical practitioner signing a certificate should be required to fill up the counterpart, which completely filled should be his voucher for payment.

7. That medical students should have practical

instruction in death certification as part of their hospital practice.

EXTRACTS FROM THE SUMMARY OF PRINCIPAL RECOMMENDATIONS OF THE SELECT COMMITTEE OF THE HOUSE OF COMMONS, 1894.

1. That in no case should a death be registered without production of a certificate of the cause of death signed by a registered medical practitioner or by a coroner after inquest.

2. That in each sanitary district a registered medical practitioner should be appointed as public medical certifier of the cause of death in cases in which a certificate from a medical practitioner in attendance is not forthcoming.

3. That a medical practitioner in attendance should be required, before giving a certificate of death, to personally inspect the body; but if, on the ground of distance or for other sufficient reason, he is unable to make this inspection himself, he should obtain and attach to the certificate of the cause of death a certificate signed by two persons, neighbours of the deceased, verifying the fact of death.

4. That medical practitioners should be required to send certificates of death to the registrar, instead of handing them to the representatives of the deceased.

5. That a form of certificate of death should be prescribed, and that in giving a certificate medical practitioners should be required to use such form.

EXTRACT FROM THE BODY OF THE REPORT, PAGE 17, LAST PARAGRAPH BUT ONE.

"Your committee consider that attendance 'during last illness' should be defined as meaning personal attendance by the person certifying upon at least two occasions, one of which should be within eight days of death."

BIRTHS AND DEATHS REGISTRATION ACT, 1874.

Section 20, sub-section 2: "In case of the death of any person who has been attended during his last illness by a registered medical practitioner, that practitioner shall sign and give to some person required by this Act to give information concerning the death a certificate stating, to the best of his knowledge and belief, the cause of death, and such person shall, upon giving information concerning the death, or giving notice of the death, deliver that certificate to the registrar, and the cause of death as stated in that certificate shall be entered in the register, together with the name of the certifying medical practitioner."

Sub-section 3: "Where an inquest is held on the body of any deceased person, a medical certificate of the cause of death need not be given to the registrar, but the certificate of the finding of the jury, furnished by the coroner, shall be sufficient."

Section 39: "Every person who refuses or fails without reasonable excuse to give or send any certificate in accordance with the provisions of the said Acts shall be liable to a penalty not exceeding forty shillings for each offence."

CORONERS' ACT, 1887.

Section 3: "Where a coroner is informed that the dead body of a person is lying within his jurisdiction, and there is reasonable cause to suspect that such person has died either a violent or an unnatural death, or has died a sudden death, of which the cause is unknown, or that such person has died in prison, or in such place or under such circumstances as to require an inquest in pursuance of any Act, the coroner, whether the cause of death arose within his jurisdiction or not, shall as soon as practicable issue his warrant," etc.

Dr. T. EUSTACE HILL read the following paper:—

DEATH CERTIFICATION AND REGISTRATION.

By T. EUSTACE HILL, M.B., B.Sc, M.O.H., Durham County Council.

I was asked to join in the opening of this discussion, partly on account of being the mover of the following resolution, which was unanimously passed last year by the Northern Branch of the Society: "That in the opinion of the Northern Branch, medical practice by unqualified persons, which prevails extensively in certain districts of Durham and Northumberland and other parts of the country, interferes with sanitary administration, and both directly and indirectly prejudicially affects the public health. That it is desirable that the attention of Parliament be drawn to the necessity of further legislation to prevent such illegal practice, and that this resolution be forwarded to the Society of Medical Officers of Health, with the request that it be supported and forwarded to the proper quarter."

This resolution as well as a paper by myself, entitled "The Unqualified Medical Practitioner from a Public Health Point of View," was published in the July number of PUBLIC HEALTH, and in that paper I endeavoured to show that a great proportion of the large percentage of uncertified deaths in the County of Durham resulted from the prevalence of unqualified medical practice in certain districts, and that such practice seriously affected sanitary administration, and also the mortality rate at certain age periods.

In my remarks to-night I do not propose to refer to death certification in its relation to qualified medical practice, as that part of the subject has been fully and ably dealt with by Dr. Lowndes; and we have already before us the recommendations of the Select Committee appointed to consider the question of death certification and registration, but I shall confine myself to bringing before you further statistics relating to the administrative County of Durham, which I think indicate the serious effect that unqualified medical practice has upon the community, and to pointing out what steps might be taken to put an end to the possibility of such practice.

In the paper read before the Northern Branch I

stated that in certain sanitary districts in the County of Durham, where unqualified men were known to be engaged in medical practice, the uncertified deaths during some years numbered from 20 to 30 per cent. of the total deaths, but at the time there were no means of ascertaining what proportion of these uncertified deaths was the result of such practice. For the year 1893, however, I have been able to obtain full information on this point, and the following statistics are, I think, interesting and instructive.

During 1893, in the administrative County of Durham, with a population of nearly 750,000, there were 14,976 deaths from all causes, and of these 688, or 4·6 per cent. were uncertified. (In England and Wales the percentage of uncertified deaths to total deaths was only 2·5.) The percentage of uncertified deaths to total deaths was greater in the rural than in the urban districts, being 5·7 in the former and 3·5 in the latter. Of the 688 uncertified deaths, 492 (3·2 per cent. of the total deaths, and 71·5 per cent. of the total uncertified deaths) were uncertified as the result of attendance during life of unqualified medical practitioners who were unable to give a legal certificate of death, the percentage of such deaths to total deaths being 1·9 in the urban, as compared with 4·6 in the rural districts. It will thus be seen that unqualified medical practice is much more prevalent in the rural than the urban districts of the county, which is chiefly owing to the fact that in the six municipal boroughs, with a population of over 200,000, there are practically no deaths uncertified as a result of unqualified medical practice.

The following table gives the sanitary districts in Durham County in which unqualified practice is most common, and also the percentage of uncertified deaths in each district:—

TABLE I.*

Sanitary District.	Estimated population, 1893.	Deaths from all causes.	Total uncertified deaths.	Total deaths uncertified as a result of unqualified medical practice.	Per cent. of deaths uncertified to total deaths.	% of deaths uncertified as a result of unqualified medical practice to total deaths.
Bp. Auckland ...	10,630	208	21	17	10·0	8·1
Blaydon	14,060	271	48	40	17·7	14·7
Seaham Harbour	9,370	217	26	26	11·9	11·9
Spennymoor	6,070	131	30	26	22·3	19·4
Auckland (No. 2 District)	35,960	640	46	46	7·1	7·1
Chester-le-Street	52,260	1,090	118	110	10·8	10·1
Durham (W. Dis.)	18,445	322	68	61	21·1	18·9
Houghton(S. Dis.)	18,700	422	72	68	17·0	16·1
Totals.....	165,495	3,304	429	394	12·9	11·9

* Bp. Auckland, Blaydon, Seaham Harbour, and Spennymoor are Urban Districts, while the other four are Rural Districts.

from which it will be seen that nearly 12 per cent of the deaths occurring among a population of over 160,000 were uncertified as a result of unqualified medical practice.

The following tables show the number and percentage of deaths in the administrative County of Durham during 1893 under one year and under five years of age, both as regards total deaths and total uncertified deaths.

TABLE II.

ADMINISTRATIVE COUNTY OF DURHAM, 1893.

Estimated population, 744,149.

	At all ages.	Under 1 year.	Under 5 years.	Percentage under 1 year to total deaths.	Percentage under 5 years to total deaths.
Total deaths.....	14,976	4,708	7,116	31·4	47·5
Uncertified deaths	688	343	460	49·8	66·8
Deaths uncertified as a result of unqualified medical practice ...	492	260	362	52·8	73·5
Deaths uncertified from other causes...	196	83	98	42·3	50·0

URBAN DISTRICT. Estimated population, 389,748.

Total deaths.....	7,586	2,384	3,651	31·4	48·1
Uncertified deaths	265	138	176	52·0	66·4
Deaths uncertified as a result of unqualified medical practice ...	150	86	114	57·3	76·0
Deaths uncertified from other causes...	115	52	62	45·2	53·9

RURAL DISTRICTS. Estimated population, 354,401.

Total deaths.....	7,390	2,324	3,465	31·4	46·9
Uncertified deaths	423	205	284	48·4	67·1
Deaths uncertified as a result of unqualified medical practice ...	342	174	248	50·8	72·5
Deaths uncertified from other causes...	81	31	36	38·2	44.4

From these tables it will be seen that the mortality under five years of age among the uncertified deaths resulting from unqualified medical practice is extremely high, and greatly in excess of the mortality during the same age period, not only for the whole county, but also among deaths uncertified as a result of no medical attendance of any kind. The figures of the above tables are therefore in accordance with a fact which I had already noted, that in those districts where unqualified medical practice was prevalent, the mortality among young children considerably exceeded that for the county as a whole, and as in those districts there are no special conditions, such as the employment of women, likely to affect infant life, there is a strong probability that the high rate of mortality under five years of age is not unconnected with medical practice by ignorant and unqualified men. When one considers the education and previous occupa-

tions of some of these unqualified practitioners, any other result is hardly possible, for the occupations of two of the most notorious quacks in the County of Durham, prior to their practising the healing art, were those of colliery brakesman and coal miner. (It is satisfactory to know that one of these gentlemen has recently been heavily fined as a result of a prosecution undertaken by the Medical Defence Union.)

As to the causes of death, I am afraid a comparison of the uncertified with the certified deaths would be of little value, for in the former class the causes of death as given in the registrar's returns, owing to their vagueness and the untrustworthy sources from which the information is obtained, cannot as a rule be relied upon. It is worth noting, however, that in the administrative county during 1893 nearly 40 per cent. of the total uncertified deaths occurred among young children from the following causes :—

Premature birth	9·1	36·7 per cent.
Convulsions	16·1	
Atrophy and marasmus	2·4	
Debility and defective development ...	9·1	

and in addition 11·3 per cent. of the uncertified deaths were returned as resulting from diarrhœa, which is also a disease chiefly occurring among young children.

The value of some of the certificates of death given by unqualified medical men practising for their own benefit (several of these quacks give a certificate of death almost identical in form with the legal death certificate), as well as the medical knowledge of the certifiers, is exemplified in the following instances: "Suppuration of the ears," "uterine causes," "spasm of the stomach," "anæmia," "appolexy," while among other causes of death certified by this class of practitioner were "childbirth," "post-partum hæmorrhage," and "puerperal peritonitis."

The most serious objection to unqualified medical practice is undoubtedly its danger to those who from ignorance or for other reasons place themselves or their families under the treatment of those carrying it on; but it is also evident that, as a result of such practice, the accuracy of our vital statistics must be greatly impaired, and that the administration of the Infectious Diseases Notification Act cannot be properly performed, as an unqualified practitioner is under no compulsion to notify to the medical officer of health cases of infectious disease, and cannot legally receive payment for any notifications he may send in. Cases of dangerous infectious disease may therefore be kept from the knowledge of the sanitary officials, and efforts taken by them to prevent such diseases from spreading would be to a great extent nullified.

From whatever point of view we look at it, medical practice by unqualified men—I must here include the unqualified assistants of registered medical practitioners, for their employment is not only opposed to the best interests of the profession but an indirect encouragement to unqualified men practising on their own behalf—is undesirable, and any reform of our present system of death certification should be such as to render it no longer possible. Other professions are adequately protected against practice by persons who are not legally qualified, and surely it is time that the medical profession, the practice of which entails an enormous responsibility, should be similarly safeguarded. But before this can be done the present law, and especially the penal clauses of the Medical Acts, must be greatly amended and strengthened. At the present time unqualified medical practitioners, acting on their own behalf, can only be proceeded against.

1. On the grounds of obtaining money by false pretences, or where two or more are implicated in the same offence, of conspiracy to defraud.

2. For practising as an apothecary.

3. For an infringement of the fortieth section of the Medical Act of 1858.

The recent trials of the Indian oculists plainly revealed that there is no probability of obtaining a conviction under the first heading, though to their verdict of "not guilty" in this case the jury added the following significant rider, "We very deeply deplore that there exists at present no criminal law to prevent persons with such gross ignorance as the defendants from practising medical surgery."

For illegally practising as an apothecary a penalty of £20 may be recovered, but as such practice is confined to the treatment of medical cases only (as distinguished from surgical), and to the prescribing and supplying of medicines for their cure or relief, it follows that no penalty can be recovered by the Apothecaries' Society from bone-setters and persons of that class.

The 40th section of the Medical Act, 1858, only deals with unqualified persons who "wilfully and falsely" assume certain titles or qualifications to which they have no right, or which would imply that they are legally qualified practitioners, etc., but the wording of the section is such as to render a conviction extremely difficult, and it has been decided in the Higher Courts that a person with no registrable medical qualification, but giving certificates of death, and describing himself as "M.D. of the Metropolitan Medical College of New York," cannot be convicted under this section. It seems likely, therefore, that unqualified medical men signing themselves M.D., with (Bc.) or any other qualifying letters after that title, cannot be successfully prosecuted under this section, the penalty for an offence against which is a fine of not exceeding £20.

It is much to be regretted that cases of "covering" of unqualified persons by registered medical practitioners are still occasionally brought to light, and it is not uncommon for unqualified medical assistants to give certificates of death with the knowledge

and even sometimes on behalf of the qualified principal. By the amendment of the present law as to the granting of death certificates, and by the General Medical Council deciding that the employment of unqualified medical assistants constituted "infamous conduct in a professional respect," such unprofessional practices would soon cease to exist, while the non-certification as a result of unqualified medical practice of the large number of deaths in Durham county and elsewhere would, in my opinion, be entirely prevented :—

1. By the law providing that an official medical inquiry shall be held into the circumstances of every death not personally certified by a registered medical practitioner.

2. By the amendment of the penal clauses ot the Medical Acts, or by the passing of a new Act, so that unqualified medical or surgical practice in any form or style, or the assumption or use of any titles which might suggest that the unqualified person using them was legally qualified to practice medicine, surgery, or midwifery in any form in this country, would be illegal, the punishment on conviction for the first time being fine or imprisonment, and for a second or subsequent conviction, imprisonment without the option of a fine.

I think the time has arrived when the Incorporated Society of Medical Officers of Health should take action in the matter we are about to discuss, and by its influence endeavour to remove a state ot things which is derogatory to the medical profession and prejudicially affects both the public health and sanitary administration.

In conclusion, I beg formally to move, as a representative of the Northern Branch, the resolution as to unqualified medical practice which has been adopted by that branch.

Discussion.

Dr. Farquharson, M.P., said: I am very much obliged to you for giving me the opportunity of being present. I don't know that I can add a great deal to what we have heard. It is a great advantage to any of us who have to work in sanitary matters, from a public point of view, to come into contact with a highly intellectual body of experts like those who are here, and get their views and criticisms. Of course, we all admit the great faults that have been found in the past from the very loose system of death certification which has been in operation. I think Sir Charles Cameron had very little difficulty in persuading the legislature to have an inquiry on the subject, but he was hardly prepared, I think, for the great mass of evidence which was brought before the Committee in support of his view. The evidence given by many witnesses of the very loose meshes allowing almost anything to slip through was extraordinary. I am not going to instruct you, gentlemen, because you know more about these things than I do, but I would urge upon you to keep pegging away at this question. Don't think because we have had a Select Committee the thing is done. There is a great deal to do yet. Parliament will only legislate when a force, the pressure of which it cannot resist, is brought to bear from outside. It is to such force we look to keep us up to the mark.

I should like to say one or two words about the criticisms of Dr. Lowndes on the report of the Select Committee. I think Dr. Lowndes approves of recommendations Nos. 1 and 3, but of No. 2 he does not approve. The first recommendation is—

> That in no case should a death be registered without production of a certificate of the cause of death signed by a registered medical practitioner or by a coroner after inquest.

Now it seems to me that the remedy of the faults admitted in recommendation No. 1 are only to be met with by the adoption of clause No. 2—

> That in each sanitary district a registered medical practitioner should be appointed as public medical certifier of the cause of death in cases in which a certificate from a medical practitioner in attendance is not forthcoming.

I think Dr. Lowndes takes rather a strained reading of the clause. I read it thus: When no certificate from a registered medical practitioner is forthcoming, a certain medical officer in the district shall be appointed to take the matter in hand. There is no ignoring whatever of the medical attendant in attendance; he is to remain as he is now, and I think always should remain. First, it is only when he has not been called in, when there is no medical attendant, that this outside practitioner is to be called in. I am strongly in favour of recommendation No. 2. I may almost go so far as to say that the recommendations of the Select Committee would not be worth much if No. 2 were left out; it is a vital part of the report. There is one criticism of Dr. Lowndes which is a very important one, that very essential (but often very troublesome block in the way of legislation) question of expense. You know we are very poor in the Government just now. The expenses increase and the revenue decreases, and I am afraid that legislation that means a large outlay will meet with a great deal of opposition. I should like to ask the gentlemen present for some expression of opinion on one or two points. We had a good deal of discussion—which is not recorded in the report—as to how the money was to be raised. Was it to be levied as a rate, or should it come from the Imperial Exchequer? You know what a howl would go through the land if the already high rates were to go up; but still I think that is the most likely plan, and my own view is that it should be found in the form of a rate. Then I should like to ask this question, whether the medical officer of health is the proper functionary to discharge these duties, or the police surgeon—as someone has suggested—or a new

man altogether? It appears to me that the work would not be enough to keep a new man. Would it be too much for the medical officers of health to have added to their already onerous duties? It will be of great service to me in this matter to be armed with the opinions of such a representative body of experts as we have here to-night.

Continuing, Dr. Farquharson thought that recommendation 3 was unanimously agreed to, and No. 4 they could pass; coming to No. 5, he said: That is another point on which I should like the opinion of the meeting. We have suggested a form, and Dr. Lowndes has suggested another. I think I like Dr. Lowndes' form the best.

Referring to the subject of unqualified medical practice, the speaker thought he might say it was hopeless to think about legislation on that subject at present. They would all like it, but it was Utopian. He did not think it would have the faintest chance of passing through the House of Commons at present. He thought the opinion in the House of Commons was that the restrictions on the liberty of the subject were already sufficient. They had to remember how the matter compared with other professions. Any man might become a clergyman. He could not perhaps go into a pulpit, but he could go to the street corner and preach. Any man could become a lawyer—he could not practice in the courts, but he could outside. He thought the suggestions made on the subject valuable, but he was bound to say he thought it hopeless to expect anything from the House of Commons on that question at present.

Mr. Noel Humphrevs (General Register Office) was very glad to respond to the invitation given him to take part in the discussion. It was very likely known to all in that meeting that the interests of the General Register Office were entirely identical with those of the medical officer of health. They all wanted two things, they wanted better medical certificates in the first place, and better certificates of the cause of uncertified deaths than they now got. He put the former first because they represented 97 per cent. He thought that medical officers of health as a body might exert a great influence to secure an improvement in the quality of the medical certificates. Speaking of the coroner's certificate, he said they were a very great defect in the whole system, a very large percentage were without any cause of death at all, they said "natural causes" or "visitation of God," or something of that kind, but in reality they were causeless. They wanted first the cause of death and then how that cause was brought about. The first duty of the coroner was to find out the cause of death, and until that was done it seemed impossible to find whether or not the death was caused by violence. With regard to the recommendations of the Select Committee he entirely agreed with Dr. Farquharson, he thought it was impossible to consider Nos. 1 and 2 separately. If they were to have certificates in all cases they must have someone appointed to give them where no medical attendant was able to do so. Mr. Humphreys went on to state that in his opinion wherever there was no proper medical certificate the case should be referred to the coroner, and the coroner should have medical referees. There was another point that should be dwelt on—that was the advisability of saving a very large amount of the expenses incurred for inquests. If these medical certifiers were appointed, a large expense for inquests might be avoided. If the post-mortems and inquiries were satisfactory, certificates would be given, and the necessity for inquests would be obviated. Passing on to the third recommendation, the question of cost was no doubt the crux of the whole point. It appeared to him that a fee of 2s. 6d. would hardly be enough, particularly in some rural districts, where very long distances would have to be covered. With regard to No. 4, he agreed with Dr. Lowndes as to the great difficulty that might arise by sending the certificates direct to the registrar. That system had failed in Scotland with most disastrous results. It should not be forgotten that anyone who was interested could, for a fee of 1s., see the certificate, so that there could not be any secrecy about it. As to the form of certificate, they (the General Register Office) had always felt that it was extremely desirable that the form of certificate should be scheduled in the Registration Act, and that it should be incumbent on medical practitioners to use it.

Dr. Lovett (St. Giles) quite agreed with the last two speakers that recommendation No. 2 should be retained. He was also of opinion that the medical officer of health should be the medical assessor to inquire into all cases in which the death is not certified. He had had a large experience in London, and had found that the coroner's constable was frequently a man without any medical knowledge, so that he was not at all capable of finding out the true cause of death, or of deciding as to the necessity of an inquest. As to the money, he thought there was no necessity for any rate to be made, because he was quite sure that the careful inquiries a medical assessor would make would prevent a large number of inquests being held, and the amount thereby saved would be sufficient to remunerate the medical assessor.

Dr. Seaton (Surrey C.C.) some years ago had acted as medical referee to the coroner in the town of Nottingham, and he could fully endorse all that had been said about the saving of public expenditure in the matter of inquests. He thought where a medical officer of health was acting for a large town and giving the whole of his time to public work, there could be no better system than that that official should act as referee to the coroner. A great many of the inquests in the manufacturing towns were really cases of infant deaths, and in these especially the word of the medical officer of health would be most valuable. The question of the rate, he thought, was not the most important question, but the fee mentioned would, in his opinion, be most inadequate to secure the services of any official of any high standing. That would raise another very important question, viz., the terms of remuneration which should be paid to medical officers of health. He fully agreed with what had been said about the importance of teaching medical students the subject of death certification and registration.

It was a practical subject which would be of great advantage to them.

Dr. DAVIES (Plumstead) thought that Dr. Farquharson would find most of them agreed with recommendation No. 2. He thought they might go further and say that in all cases a medical man should be the chief registrar in the district, and that the medical officer of health was the proper man to be that officer, but he rather took exception to what had been said as to the medical officer being only referee to the coroner. It seemed to him these duties came most naturally under the medical officer of health, and he thought his position ought not to be put under that of the coroner. He thought the position of coroner was antiquated and in the present day anomalous. They all knew that a very large number of the inquests held were only wasted time. Referring to recommendation 4, he could not see why the medical man should not send the certificates direct to the registrar. There was no doubt it was unpleasant to have to hand to relatives death certificates which implied some kind of censure on their departed relative. He would not have the least compunction in stating the plain cause of death if the certificate was going direct to the registrar, but if he had to hand a certificate to a son telling him his father died from alcoholism or syphilis it would be a very different thing indeed. Dr. Davies went on to refer to the difficulty the medical officer frequently had in deciding which was the primary cause of death. He had recently had a certificate marked "Scarlet fever, diphtheria, and whooping cough." Which was the primary cause, and under which heading was it to go in his report?

Dr. WILLOUGHBY said that he often found certificates given by medical men required a certain amount of revision, and it was evident this must be done by the medical officer of health. At the present time they had the appointment of superintendent registrar held by a lawyer or a man of no profession at all. He thought it a good suggestion that that appointment should be held by a medical man. There was every argument in favour of it, and none against it. The unification of the two offices of medical officer of health and superintendent registrar seemed to him to be necessary. They got certificates marked "teething" or "change of life," neither of which were the cause of death. Such certificates required inquiry, and that could only be undertaken by a medical man. The following Dr. Willoughby quoted as specimens of certificates needing revision: "A man, aged 74, certified to have died of—(1) Alcoholism; (2) fracture of jaw; (3) bronchitis; (4) morbus brightii; (5) inguinal hernia; (6) cerebral hæmorrhage." "A man, aged 55—(1) Sciatica two years; (2) valvular disease of heart two years; (3) mitral disease one year; (4) lardaceous disease of liver and kidneys six months; (5) debility four months." There were other certificates which always required revision, such as puerperal fever and croup.

Dr. BOSTOCK HILL would only say that he agreed with Dr. Farquharson that if they took No. 2 from the recommendations they took the whole vitality out of them. With regard to the medical officer of health being the registrar, it seemed to him there would be a great difficulty in the way in a large town. Birmingham, for instance, was a large city, and they had an average of 200 deaths per week, and it would take a man's whole time to look after their registration. In many cases he could see that to combine the offices would be desirable, but in others not, and he thought they should not lay down any hard and fast rule. The speaker referred to the motion submitted by Dr. Eustace Hill, on behalf of the northern branch, which, he said, appeared to him not to have really very much to do with the question they were discussing.

Some conversation ensued as to the form the motion should take, and Dr. Eustace Hill said that having regard to what Dr. Farquharson had said on the subject of unqualified medical practice, he would, with the permission of the meeting, withdraw his motion.

Dr. DAVIES, by permission of the meeting, moved, and Dr. EUSTACE HILL seconded, "That this meeting of medical officers of health urges on Parliament to take legislative action to put into force the recommendations of the Select Committee of the House of Commons on death certification and registration."

The CHAIRMAN expressed his concurrence with the remarks that had fallen from several speakers as to recommendation 2; in his opinion it contained the whole gist of the matter. As to the suggestion to appoint the medical officer of health as superintendent registrar, he thought that in a moderate sized district, where the work could be performed by one man, it would be desirable, but in many cases it would be impossible, because of the very large area of the district. As to the question of cost, he agreed that the result of the medical inquiry would be that many inquests would be saved, and that question was therefore not so serious as some had thought.

The motion was then put to the meeting and carried unanimously.

PROCEEDINGS OF THE YORKSHIRE BRANCH OF THE INCORPORATED SOCIETY OF MEDICAL OFFICERS OF HEALTH.

A MEETING of the branch was held in the Town Hall, Hull, on Thursday, February 15th, 1894. The following were present: The President (Dr. Whitelegge), Drs. Spottiswoode Cameron, Harvey Littlejohn, Kaye, Burman, Johnstone, Buchanan, Deville, Shives, Laverick, Broughton, Pogson, Ainley, Hunter, and the Honorary Secretary (Dr. J. Wright Mason). There were also present as visitors: Mr. Alderman Fraser (Chairman Hull Sanitary Committee), Mr. Councillor Cohen (Deputy Chairman), Mr. Alderman Sherburn, and Dr. Robinson (Sheffield).

Previous to the meeting, the Mayor (Mr. Councillor Richardson) received the members, and afterwards entertained them to luncheon.

Letters of apology regretting their inability to attend were read from Drs. Mitchell Wilson, North, Watts, Mackenzie, Robinson, and Close (Deputy M.O.H. Hull).

The minutes of the previous meeting were read and confirmed.

The following were then elected members of the branch, viz.:—

C. E. HOLLINGS, L.R.C.P., M.O.H. Calverley.
R. CUFF, M.B., M.O.H. Scarborough.
A. MACVIE, M.B., M.O.H. Baildon.
V. H. FISHER, M.B., M.O.H. Howden.
W. SCATTERTY, M.B., M.O.H. Keighley.
G. H. MOORHEAD, L.R.C.P., M.O.H. Hunsworth and Tong.
W. KNOTT, M.D., M.O.H. Ormesby.
M. YOUNG, M.B., M.O.H. Brighouse.
C. E. THORP, L.K.Q.C.P., M.O.H. Todmorden.
R. FORSYTH, M.D., M.O.H. Birstall, Birkenshaw, and Drighlington.
J. J. JACKSON, L.R.C.P., M.O.H. Wakefield, R.D.
E. D. WELLBURN, L.R.C.P., M.O.H. Sowerby Bridge.
A. S. WILLIAMSON, M.B., M.O.H. Sandal.
A. SWANN, M.D., M.O.H. Batley.
W. L. ALLOTT, M.D., M.O.H. Hoyland Nether.
J. PICKEN, M.B., M.O.H. Rawmarsh.
J. F. CHEESEWRIGHT, L.R.C.P., M.O.H. Greasborough.

J. G. E. Colby, M.B., M.O.H. Malton.
G. H. Higgins, M.R.C.S., M.O.H. Cleckheaton.
T. G. Drake, L.R.C.P., M.O.H. Thornton.
R. N. Denning, M.D., M.O.H. Elland.

The new rules as recently revised by the Council were submitted, when it was moved by Dr. Cameron, seconded by Dr. Littlejohn, "That the consideration of the new rules as revised by the Council be adjourned until the next quarterly meeting, when amendments, if any, may be considered, and that the rules be finally adopted at the annual meeting to be held in June next."

A discussion, "The Prevention of Infectious Diseases," was introduced by (1) Dr. Spottiswoode Cameron, Leeds, on "Methods of Disinfection and Extent to which it is Desirable to go in Dealing with Different Classes of Disease"; (2) Dr. Kaye, Huddersfield, on "Prevention of Infection amongst School Children"; (3) Dr. Johnstone, Ilkley, on "Isolation at Home and in the Hospital."

Methods of Disinfection and extent to which it is desirable to go in dealing with different classes of disease.

By J. Spottiswoode Cameron, M.D., B.Sc., M.O.H. for Leeds.

It is perhaps convenient to classify diseases, on account of which we go to the trouble and expense of disinfection, into three groups.

I. Those in which, as in small-pox, typhus, and scarlet fever, disinfection of the house, person, and clothing, not only of the patient but of those in contact with him, should be carried out *à outrance*.

II. The group containing typhoid, diarrhœa, and cholera, in which the disinfection of the discharges is the essential thing.

III. The group containing diseases such as measles, whooping cough, erysipelas, puerperal fever, and croup, about certain of which there is, in some minds, a question as to whether the advantages of disinfection compensate for the annoyance unavoidable in the process.

Taking these "three degrees of comparison" in reverse order, let us begin with the third group. It would be impracticable to insist upon the absolute isolation and subsequent disinfection of every case of whooping cough; and some persons (even some medical men) would be inclined to say that, in the comparatively small number of cases which come to the knowledge of the sanitary authority, it is not worth while to put the friends of the patients to the trouble which anything like efficient disinfection involves. On the other hand, it is probably safe to say that in fatal cases of whooping cough (which naturally form the bulk of those of which we hear) there is usually some complication which has been the immediate cause of death; and in the greater number of such cases this complication is itself largely the result of insanitary conditions surrounding the little patient. These conditions are sometimes structural, as to the house, and the visit of the inspector should lead to their removal. Not seldom they are the result of dirty surroundings, and the fumigation of the house with sulphur, the consequent opening of the windows and doors, and the cleaning which should follow, are all, in these cases, things most desirable.

About disinfection after measles there is probably less difference of opinion. In Leeds we are here also content, as a rule, to stove the house with sulphur, to subject to super-heated steam all fabrics that cannot be washed, and to insist upon a good clean-down. Here, also, penal measures would seldom be resorted to.

Still working backwards, we come to the middle group. All are probably agreed that in the case of typhoid fever it is needful to insist upon the complete disinfection—preferably by dry steam—not only of the bed and bed-clothes, but also of the bed curtains and valences, the carpet, and the garments of the patient and attendant. If the floor is bare, it should be washed with a strong solution of mercuric chloride; but what should be regarded as not the least important part of the process is that applied to the closets, drains, and ashpits of the house. On receiving notice of a case of typhoid fever (and to avoid repetit on it may be here stated that this plan is carried out in regard to all infectious diseases of which we hear, even measles, whooping cough, and pneumonia), notice is at once served upon the cleansing department to have all accumulations removed, in the case of typhoid fever and diarrhœa immediately, in that of other diseases as soon as is compatible with other work. The hose pipe is also sent, and the traps and drains of the house and of others in the near neighbourhood flushed and disinfected. This is done whether we remove the patient or not, and on the following grounds.

Supposing we are going to leave a patient with typhoid fever to be nursed at home we shall endeavour to prevent any motions in future from going directly into the drains. For this purpose we provide a tub with an air-tight lid, into which all discharges, which have been previously received into a disinfecting solution, are placed. This tub is removed at frequent intervals and replaced by a clean one, thoroughly disinfected. Its contents are conveyed to the destructor and burnt. But it is probable that, before we knew anything about the case, perhaps before the nature of the illness was discovered, undisinfected discharges may have been allowed to enter the drains, and similar matters may have been transferred to the ashpit. It is therefore desirable, as soon as the case is heard of, to empty the ashes-place and transfer its contents to the destructor. The flushing and disinfecting of the drains is equally necessary, and has the additional advantage of letting us know if there is any stoppage.

It is our usual practice when a case of typhoid

has been left at home to repeat the flushing and cleansing after the patient is well, so that mischief resulting from any carelessness on the part of the nurses may be minimised.

In the supposed typhoid case belonging to this second group, the preliminary cleansing of the drains and ashpits, the disinfection of all discharges as they leave the patient, the removal of these discharges by the sanitary authority, the second cleansing of the drains and ashpits after recovery, with the disinfection of the patient's apartment in the way already described, would usually be deemed sufficient.

The process should, of course, include a thorough examination into the sanitary condition of the house, the relaying, if necessary, of defective drains, and the disconnection of all wastes from the sewer.

In disinfecting the drains of houses where choleraic diarrhœa occurred last year we made use of a strong solution of carbolic acid to which a certain quantity of sulphuric acid was added. The proportions used were sixteen ounces of crude carbolic acid and two ounces of commercial sulphuric acid to a pailful of water. This was placed in all the earthenware traps round the house, was used for flushing flags over which discharges might have passed, and for sprinkling on the ground where accumulations of rubbish might possibly have been infected.

The reason for using the sulphuric acid was to acidify any particles left adhering to the pavement, traps, or other parts, and render them incapable of acting as hotbeds for the specific spirillum. The phenol was to destroy any other germs which might resist the acid treatment. Phenol being sparingly soluble in acid, part of it remains behind in traps to be dissolved by any alkaline matters, such as wash liquor, strong enough to neutralise the acid. Ashpits were treated with a nearly anhydrous ferrous sulphate in powder.

It may perhaps not be out of place to remark here that should a few stray cases of cholera break out in Leeds we propose to secure nursing for them at their own homes; and if these are overcrowded, to provide lodging, under our own observation, for the rest of the family. The disinfection of drains and discharges would be carried out in the manner described, and of course all bedding, clothing, and textile fabrics that had been exposed to contamination, would be subjected to disinfection by steam. The illness at an end, the whole house would be disinfected in the ordinary way.

Continuing to work backwards, we come to the first group, to which belong diseases such as small-pox, typhus, scarlet fever, and, most of us if not all would add, diphtheria, in which no quarter must be given to the infective agents. Every article of clothing that has been in the room with the patient, whether worn by himself, by his attendant, or even by a visitor, should be disinfected by heat. If a patient is left at home, the medical man in attendance ought to provide himself with a wrap, coming close round the neck, and reaching to the ground. On leaving the room this wrap should (except the sleeves) be turned inside out, buttoned, folded in a sheet of paper, and placed on a shelf in the bath-room or ante-room for the next visit. The medical man should also himself visit the bath-room and disinfect his face, beard, and hands with soap and water, drying them on a towel brought from the laundry in a sealed paper packet to be opened by himself. At short intervals the wrap should be handed to the sanitary authority for disinfection. The same precaution ought to be taken in regard to all visitors to the apartment. Those who are more than flying visitors ought to take a bath, and the whole of their clothes should be disinfected by heat before they go into the outer world. All discharges should be very thoroughly disinfected. So should everything that leaves the room. Even knives, forks, and plates should be subjected to this process before they are sent down to the kitchen. In cases of scarlet fever some harmless ungent applied to the skin, as recommended by the late Dr. Budd, will limit the dispersive power of infective cuticle. When the patient has recovered, the walls, floors, and ceiling of the room should be washed over with a solution of mercuric chloride of a strength of about one part in a thousand. The paper, while still moist, should be then stripped from the wall, placed in a bag, and carried to the destructor, or, in the country, burnt in the fireplace of the room itself. The latter should then be stoved with sulphur, and handed over to the house decorator. The same should be done with the passage, ante room, and bath-room used by the patient and attendant. Of course, if the passage and bath-room are varnished and perfect it will be sufficient to wash them over first with a solution of corrosive sublimate and sponge them down the following day with pure water. This last method has been adopted also in Leeds for wainscotted rooms. They are first washed over with a strong solution of corrosive sublimate, not weaker than one in a thousand, taking care that the liquid goes into all the crannies of the woodwork. The following day the whole is washed again with plain water or soap and water. It seems desirable to leave no potent particles of sublimate upon the walls. The use of sulphur afterwards to render any remaining perchloride insoluble is advantageous.

Two questions will naturally arise. (1) Is not simple stoving with sulphur sufficient? (2) Is the stripping of the room necessary in every case?

Our working rule in Leeds has been to strip the sick-room itself in every case of small-pox. If the patient had been confined to bed before the eruption appeared, and if there has been no commerce with the rest of the house since, stoving and

cleansing are considered sufficient for the other rooms; but if he had been moving about the house after the appearance of the eruption, we think it necessary to strip the whole house, that is, of course, where there is a paper to strip.

In scarlet fever our rule is to strip at least the bed-room when the patient has been treated at home. The number of rooms to which this should be extended will depend upon the efficiency of the isolation. Where the patient is at once removed to hospital, say the day on which the eruption appears, it does not seem so absolutely necessary to strip the paper; stoving with sulphur, the copious ventilation which this entails, and the subsequent cleaning are perhaps sufficient, always supposing that the textile fabrics, in which the infection is most easily and commonly carried, are themselves thoroughly disinfected by heat.

The obvious reason for this difference is the *time element*. If a patient has been only a day or two in the room, the amount of poison to be destroyed is very much less than when the patient has been confined to the same apartment for six weeks. In the former case the free ventilation which stoving with sulphur entails, along with a thorough cleaning is probably sufficient, *where all articles in which infection can be retained have been removed and treated by steam.*

The poison of small-pox is, however, so potent that I should not be inclined to trust to stoving with sulphur, even where the patient had been removed from the room the very day the eruption appeared. Dr. Harvey Littlejohn tells me that although he agrees in principle with the advisability of stripping in case of small-pox, yet, as a matter of experience, in Sheffield no second case has been traced to a house disinfected in the ordinary manner by sulphur. I mean, of course, no case can be traced to infection received after the process had been carried out. But the circumstances in Sheffield are peculiar. The inhabitants of that city are amongst the best protected persons in England. The serious outbreak of 1887-88 has left the community but very slightly susceptible to small-pox. The survivors of those attacked are better protected than if they had been revaccinated, and large numbers of those who escaped attack did so because they had been revaccinated. The persons also who returned to the disinfected houses had in almost every case been protected by a recent revaccination.

I have said that with diseases of this first group we fight the infection *à outrance*. Let me describe, as typical, what we should do in a case of small-pox. When a case is reported orders are given for the flushing of the drains, the emptying of the ashpits, and, if we have the requisite permission, for the removal of the patient. The ambulance is followed by the disinfecting van, and our men take possession of the room at once. The other members of the family are conveyed in another ambulance to our isolation cottages, where each has a bath and his clothing is disinfected. There he remains till the house is ready. In most cases by a little management we can persuade such members to stay until a fortnight has elapsed from the date of the disinfection of their clothes and persons. Should any of them show signs of illness he is immediately isolated and, when it is clear that the disease is variola, transferred to hospital. The disinfection of the clothes, person, bedding, etc., of the rest of the family is repeated, and the wainscotted room washed down with corrosive sublimate, or stoved with brimstone.

Let us now return to the original house which we left in charge of the disinfecting men. These act under the superintendence of one of the two divisional inspectors, who is responsible for the safety of articles left in or removed from the house. Articles of great value not requiring exposure to heat, he transfers, after such disinfection as is needful, to the office safe. Articles of lesser value not requiring such disinfection he dusts and places in some locked cupboard of the house; but all carpets, covers, garments, curtains, valences, and the like, which have been exposed to infection (and that means in an ordinary three-roomed cottage all such articles) are made up in bundles and sent to the corporation disinfecting station. The house is then dealt with in the way described, wooden articles of furniture being treated in a similar manner to the walls of wainscotted rooms. The key of the house remains in possession of the disinfecting staff until the process is complete, and is then handed over to the chief inspector.

The bundles containing fabrics, which have been transferred to the station, are there opened by an official in the "receiving-room." He makes an inventory of their contents on a printed form. Each form is numbered consecutively, is triplicated, and each of its three parts has a letter attached. Counterfoil "a" remains in the book undetached. Parts "b" and "c" are detached and sent through the disinfector with the articles referred to. Counterfoil "b" is kept by the officer in charge of the rooms on the uninfected side of the apparatus. Form "c" is returned with the disinfected articles to the house. On the back is a printed receipt, which the occupier is asked to sign. It then comes back to the sanitary office, where it is retained. This part of the form has to be initialed by the divisional inspector. In addition to the list of articles disinfected by heat, it contains a statement as to how many houses and rooms were disinfected by sulphur, washed with corrosive sublimate, stripped, or what combination of these methods was adopted. The consecutive number of this form is then entered in the zymotic book against the name of the patient. A similar form is filled up in regard to the clothing of other occupants of the house, and its number is also entered in the

zymotic book. Other similar forms refer to the clothes of the workpeople employed in the disinfection of the house, for at the end of each day's work they repair to the station, where they take a bath while their clothes are in the steam apparatus. If these forms are carefully entered up, it is therefore possible to tell in regard to any case exactly how much disinfection was done, and it is our habit to refuse a certificate where, as is now frequently the case, employers ask for it, unless the amount of disinfection deemed necessary has been fully carried out. Such certificates would not state that the members of the patient's family are fit to return to work or school unless a fortnight in cases of small-pox, and a week in cases of scarlet fever had elapsed since the date of disinfection of their clothes and dwelling. All our ward inspectors are instructed as to the importance of thorough disinfection and are able to explain to occupiers and friends the necessity of doing the thing properly. In the majority of cases medical men attending patients ask the corporation to disinfect and leave the method entirely with them, but in a few cases a practitioner himself undertakes to certify that disinfection has been done to his satisfaction. Such certificates are, of course, treated with every courtesy, but in some cases it has been thought desirable to draw the attention of the certifier to the fact that the corporation have provided a very efficient disinfecting staff and apparatus, and that the mere stoving of the house with sulphur can scarcely nowadays be regarded as in all cases sufficient.

Here, again, comes in the question of the value of the various disinfecting processes. We all know that sulphurous acid has very little power of killing pathogenic germs, and we are all agreed that to trust to the stoving of the sick-room and the articles of clothing contained in it by sulphur alone would be below the requirements of modern sanitary science. On the other hand, I am not prepared to say that because the fumes of burning sulphur do not destroy anthrax spores that the process usually adopted is altogether useless.

We have to keep always in mind the two things that are necessary to the production of an infective disease—the bacterium and the subject. But we are apt to forget that the number of the specific pathogenic bacteria is a very important factor. The attack of healthy leucocytes, or, if one prefers it, of the protective alexines upon a small quantity of the living poison is generally successful; and the chances of such success are probably, *ceteris paribus*, inversely as the quantity of the bacterial poison received. But it must be remembered that, of the actual pathogenic bacteria thrown out from an infective patient, comparatively few reach a receptive individual in a still active condition. Some, no doubt, are capable of being dried and yet retaining their potency for ill, but probably most of them only retain their activity under specially favourable circumstances. These circumstances are either such as are preservative, or those which favour reproduction. The typical preservative (1) process resembles more or less the artificial methods of keeping vaccine virus in sealed capillary tubes, on points, or between glass plates. Every vaccinator knows the greater potency of tubes over plates or points, but even tubes are less potent than lymph direct from the arm. The reproductive (2) element is typified in the increase of the poison of typhoid fever in a stopped drain, or its reproduction in milk. In both cases the surviving bacterium, finding a convenient nidus, proceeds to obey the divine command to increase and multiply. It is well known that a process which would not even destroy all the bacteria, and which would certainly not destroy their spores, if they have any, may yet discourage their multiplication.

Stoving a room with sulphur probably results in a somewhat complicated chemical process. In the first place oxygen combines with sulphur to form a dioxide, which, in the presence of moisture, forms sulphurous, and in time, sulphuric acid. The presence of neither of these acids is conducive to the free cultivation of the majority of bacteria. But any one who has examined such woollen articles as blankets a day or so after the process of stoving with sulphur, will have detected a distinct smell of sulphuretted hydrogen. The hydrogen must have been chiefly obtained from the moisture in the atmosphere, and, in breaking up the water molecule, nascent oxygen was probably set free. Such nascent oxygen is much more powerful as a disinfecting agent than the dilution of the same gas with nitrogen which constitutes our ordinary atmosphere.

The material in which the bacterium will have to live and multiply is generally composed of organic dirt, much of it voided in the process of respiration. The attack upon one part of this material of the sulphurous acid, in its search for further oxygen, and upon another part of the nascent oxygen, set free from the water molecule, tend probably to break up these organic substances into less complex forms, and to leave a less favourable nidus for the development of pathogenic bacteria. So that, although the actual germicide power of the sulphur di-oxide may be small, this cannot be regarded altogether as the measure of its disinfecting value.

While, however, admitting that even stoving by sulphur may have a beneficial effect, chiefly by destroying the pabulum of the germ, it would be unwise to consent to the treating of textile articles simply in this way. Organic matters in the meshes of such articles are, to a certain extent, protected from the oxydizing and reducing processes described, and in these meshes germs can find a peaceful resting place in which to colonise. Im-

mersion in boiling water for a few minutes, however, does for these evil workers. Lengthened exposure to dry heat will also destroy them, but the most rapid, and on the whole most convenient process, and the one which does least harm to most fabrics, is immersion in dry steam.

A complete disinfecting station would include apparatus for disinfection by heat in both ways. It would be separated into two parts: one for the reception of infected goods, the other for sorting and arranging them after they had undergone purification by heat. It would have bath-rooms for the use of persons from infected houses, while their clothes were being purified. Such a station would be provided with two sets of vans, one for conveying infected articles from the house, and another, quite different set, for returning those which had been disinfected. If we insist, as I think we ought to insist, upon a very complete disinfection of the premises of the ratepayer, our arrangements ought to be such that our own staff cannot be even suspected of conveying infection themselves. This means that the medical officer of health and the inspector visiting an infected house should use such a wrap as has been described, and a separate one for every suspected house he visits; and that he should send it at once to the station. The men employed in disinfecting and cleansing the house must have their own clothes disinfected before they go elsewhere. In a word, the sanitary staff must themselves be—like Cæsar's wife—not merely innocent, but above suspicion.

The Prevention of Infectious Diseases in Schools.

By James Robert Kaye, M.B.,
M.O.H. for Huddersfield.

Much consideration is necessary in determining the influence of a school in the propagation of infectious diseases, for we should not willingly assert that because a number of cases of scarlet fever occurred in a district, and chiefly or exclusively amongst the scholars of a particular school, that it was the medium of infection; but if during the outbreak all other avenues of infection have been eliminated, and if upon an examination of the pupils of that school we find one or more in the stage of active desquamation from scarlet fever, then there is reason to suspect that school, or, again, if in a village or district there are two schools, and one produces patients while the other remains free or slightly affected, then the former may be reasonably suspected, while the latter may probably owe its freedom from the outbreak to a relatively large number of children protected by former invasions.

Further, the conditions appertaining to school life are much more likely to foster infection and promote extension of it than the home.

1. Because the mortality from infectious diseases is principally amongst children under five years of age, and it is common to find the first cases in the infants' department. This might suggest that children under five should be prohibited from attending school, not only with benefit to themselves and little loss to education, but with marked benefit to our mortality rates from measles and scarlet fever, and the other infectious disorders incidental to early childhood.

2. Because of the aggregation of the unshielded, and therefore susceptible material.

3. Because this material is constantly exposed, and the infection once introduced has every chance of spreading.

4. Because the area is extended from which the susceptible material comes.

5. The atmosphere of schools, generally speaking, is conducive to the diffusion of infection.

The most important diseases which radiate from an infected school may be classified roughly as follows:—

1. Infectious diseases, such as measles, scarlet fever, diphtheria, whooping cough, chicken pox, etc.

2. Diseases of a purely contagious character, *e.g.*, ringworm, ophthalmia, scabies, etc.

3. Diseases implying local insanitary conditions, *e.g.*, enteric fever and diarrhœa.

It is to the first group that I desire especially to address myself. As to the second group, while they are in all conscience important enough, they do not affect our vital statistics much. And as to the third class such diseases as enteric fever ought never to exist in connection with any school.

The avenues by which infectious diseases are introduced into schools may be practically reduced to three:—

1. By the infected in the early stages of the diseases.

2. By the infected during convalescence.

3. By the healthy from infected houses.

The prevention of infectious diseases in schools presents great practical difficulties. In fact, the greater our efforts and consequent success in the diminution of infectious disease in pre-school ages, the more susceptible will the school-going child be to epidemic influences if we believe in the theory of the aggregation of unprotected material.

Our efforts when successful do not end with the immediate prevention of the attack, but we can also consider the importance to the individual, and to the State, by starting him in life free from the enfeebling and often permanently crippling efforts, say, of an attack of scarlet fever.

The appearance of sporadic cases is the earliest symptom, if unchecked, of the coming epidemic; and the practical deduction is to attempt to smother it at its birth by tackling those cases, for the Notification Act has disclosed the fact that it is easier to exclude the importation of infection than to check its dissemination.

I re-echo the unanimous voice of the profession in stating that the first essential to enable us to

deal effectively with infectious diseases is early notification, a measure which should be universally enforced, for without it

"Disease, unknown to men,
Creeps, no precaution used, amongst the crowd."

Notification is the *sine qua non* of preventive action, and where the Act has been adopted the teacher ought to receive an intimation (Form A, Appendix) from the Health Department of any child suffering from any of the notifiable diseases, but where the Act is not enforced the position of the medical officer of health to teacher becomes reversed, and the earliest information may come from the teacher, or it may be through the death returns; and the same remarks hold good with regard to non-notifiable diseases, *e.g.*, measles, a disease which, in spite of some reasons against it, should be scheduled for compulsory notification, because the action then adopted by health authorities would tend to dispel much of the popular ignorance about that disease, and thus diminish its great fatality.

To determine aright the means to be employed in the prevention and control of infectious disease it is absolutely necessary to bear in mind the various features of the disease.

It is essential that the period of incubation and the duration of infection should be clearly understood, for the admission of a single child during convalescence may undo all the benefits derived from the isolation, and on the other hand unnecessary prolongation of quarantine and isolation affects the education of the child, and the wage-earning in the adult.

The next measure which may be aptly termed the hand-maiden of notification is the isolation of the infected, and consequent exclusion from school of the other school-going members of the household.

The other measures to be adopted must depend on whether the isolation of the sick is to be attempted in a properly adapted hospital, or at home where it is in 99 per cent. of cases a farce.

If in the former, then a fourteen days' quarantine from the last appearance of the disease will suffice, on condition that the clothing of the uninfected has been properly disinfected; if on the other hand the patient is being treated at home, then the other children should be excluded from school during the whole of the illness, unless they have been removed early to another house and there passed the quarantine period without any appearance of the disease; and even then it would be safer to exclude these children because of the danger of inter-communication by relations and by infected articles from home. On no condition whatever should a child who has suffered from infectious disease be admitted without a health certificate stating that the child is perfectly free from infection from head to foot. (See Health Certificates Form I. and II., p. 218.

So far our action is fairly plain sailing, but my great difficulty has been to exclude children actually suffering from infectious diseases. I refer specially to scarlet fever. A child is absent from school, say, four or five days, and then returns to be an active centre of infection without any questions being asked as to the cause of his or her absence, and my contention is that no child should be admitted or re-admitted without at least an examination by the school authorities, and this examination should also apply to all admissions and re-admissions. I fully recognise the fact that the majority of teachers have their hands already full of other business, but the action suggested by me would impose little trouble, present no economic difficulties, neither does it require an expert to accomplish the object. And, moreover, it is certain that increased school vigilance against infectious disease would result in a lessened mortality and sickness, with higher average attendance and better educational results.

Any certificated teacher in a school, and especially one who had received elementary instruction, could devote a few minutes each morning in a special room provided for the purpose.

It would not be necessary for the examiner to fully satisfy himself that the child was the victim of an infectious disease, but only that there was any suspicion on the one hand, and freedom on the other. If there did exist any suspicion, then the child should not be admitted until one of the two already-mentioned certificates had been returned duly signed by a registered medical practitioner, the cost of which should be defrayed by the sanitary authority.

The demand for some such action with respect to absentees becomes intensified with the increased efforts of the school authorities to secure attendances.

Let me here condemn the system so much in vogue of sending healthy children with notes to inquire as to the cause of absence of schoolmates, for not infrequently the little inquirer is thoughtlessly asked to step inside, thereby risking infection if the disease be of that nature. Just as the parents have a duty to perform in preventing the introduction of infection into the school by their children, so school authorities should use every possible precaution to prevent home infection by means of the school.

The anxiety of parents to get their children to pass the required standards, and the reward of prizes for attendance, act as inducements in many cases to be present at school when the ailing scholars really should have remained at home. On two occasions localised outbreaks of scarlet fever, which could be traced to these causes, and which in each instance preceded the annual inspection of the pupils, led me afterwards to make three recommendations.

1. That absence due to infectious disease

should not interfere with the attendance or prize awards.

2. That in addition to the usual annual inspection, there should be another central examination for all absentees from sickness in the various schools; or (3) that the teachers should exercise their powers of classification in advancing children to higher standards. This is a power with which the parents are, generally speaking, unacquainted.

In the Huddersfield School Board a step in advance has been made by not deducting the absences of those who, though not affected, are excluded from school by reason of infection in the household, but this is not granted to the actual sufferer, who surely should have the same favour.

A difficulty remains when the disease is confined to the younger non-school going members of the household, because the teacher is kept in ignorance, but if notification is in force wilful concealment of such cases to allow others to attend school will not be so common.

Beneficial results might follow the education of the young upon the evil consequences to their schoolmates of attending school when their younger brothers and sisters are passing through infectious diseases. The principles of the science of prevention are involved in no mystery, but are such as may be easily acquired, and if enforced would yield a highly profitable return in the lessened interruption of the educational progress of the pupils. There need be no curtailment of any study, and I do think that an educational system which insists upon the knowledge of elementary anatomy and physiology should find a place for the immeasurably more important topic of personal and civic hygiene.

If this process of exclusion, combined with the distribution of handbills containing instructions amongst the scholars, fails to prevent an outbreak, we must then adopt other measures to arrest the dissemination of the disease.

My plan is to institute a home visitation of all children absent from school for the past twenty-one days, and this action does not unduly interfere with the routine of school life.

The inspectors visit, and if a doctor is in attendance no further inquiries are made beyond obtaining the source of the milk supply, while if no doctor has been called in and the inspector has any suspicions after inquiry, the parent is requested to have Form I. and II. certificate filled up by a medical man, or he refers the case to the medical officer of health.

This action is most effectual if combined with the simultaneous examination of every child in the school, so that the scholars have no time to acquaint the parents before the inspectors have made their visits. By these means there is less likelihood of any child being overlooked.

There must of course be some justification for visiting the school, because the attendances after the visit of the health officer will suffer on account of the natural fear that there must be something wrong at the school.

With the examination of the scholars and absentees, the schoolrooms and lavatories are disinfected by means of SO_2. The floors and desks are afterwards sprinkled with a solution of carbolic acid or carbolised sawdust, and then washed.

These proceedings are not so applicable to measles as to scarlet fever, for the outbreak of the former is in the absence of compulsory notification, generally beyond control before the information reaches the Health Department, and it may then be necessary to consider the advisability of closing the school for a specified period.

As you are aware, in the Public Health Act, 1875, there is no provision for the closing of schools, any more than there is for the notification of disease, but it affords powers for the disinfection and cleansing of schools. A thought has struck me that perhaps teachers might come under the provisions of section 126 of the Public Health Act, 1875, but it would require some stretch of the imagination to make it of practical utility.

This omission in the Public Health Act is remedied in Huddersfield by the Corporation having power under the Huddersfield Improvement Act, 1880, section 63, to order any school in a neighbourhood affected by infectious disease to be closed, while in the country generally the power is conferred upon sanitary authorities by the code of regulations approved of by the Lords of the Committee of Council on Education.

In that code it will be seen that alternative powers are granted, viz., the exclusion of any scholars, which I have already considered, and secondly, closure, which I will now deal with.

If exclusions, supported by simultaneous examination of the scholars and absentees and disinfection of the school premises fail, which is rarely the case where early information has been received of the occurrence of infectious disease, then closure may be advisable to arrest the progress of the disease, particularly in those cases where the centres of infection are numerous and its progress rapid.

This measure is a serious matter from an educational point of view, and should not be suggested without due consideration. I am not an advocate for routine closure, but I fear that sometimes this action is too long delayed, especially with respect to measles, from the fact that during the early period of an outbreak the medical officer of health is on the horns of a dilemma in exercising his power. He is anxious to arrest the diffusion of the disease, and at the same time wishful not to interfere with the children's education.

In arriving at a decision such considerations as the type of the epidemic, the situation of the school, and to some extent the characters of the children attending it, the effect of measures adopted, and

FORM A. HUDDERSFIELD URBAN SANITARY AUTHORITY.
EDUCATION CODE, ART. 98, 1886.
Sanitary Offices, Ramsden Street.

Name.....

Residence.....

The following Infectious Disease, viz. :.....

Note A. (Hospital). exists in the house situate in.....and occupied by.....members of whose family are said to attend your school.

The patient is isolated at ....(See Note).

Note B. (Home). The other children of the family may attend school after 14 days' quarantine, of course presuming no other case occurs during that period.

No child from this house should attend school for a period of at least eight weeks after the occurrence of the last case, and only then where disinfection has been carried out to the satisfaction of this authority, and the Medical Practitioner in attendance.

By enforcing the above recommendations much may be done to prevent the spread of infectious disease.

JAMES ROBT. KAYE,
Huddersfield. Medical Officer of Health.

COUNTERFOIL.

Name..... *Form filled up*.....

School..... *Date*.....

COUNTY BOROUGH OF HUDDERSFIELD.

FORM I.—CERTIFICATE OF FREEDOM FROM INFECTIOUS DISEASE. (*a*)

I hereby certify that at the request of the teacher of the (*b*)..... School, I have carefully examined (*c*).....aged (*d*).....years, living at the house occupied by (*e*)..... at No. (*f*).....Street, Huddersfield, and that I find the child from head to foot free from desquamating cuticle or other sign of a recent attack of any infectious disease however slight, and I am therefore of opinion that the said child has not *within three months* had any such ailment or disease, and (*k*) I am also of opinion, from careful inquiry, that no such disease has *within three months existed in the house*, and I therefore certify that the said child may, with safety to the other children of the school, be admitted as a pupil in the usual way.

(*Signature*)

Dated this.....day of.....18 *Registered Medical Practitioner.*

a.—Form I. or II. may be filled up by any Registered Medical Practitioner, and a *fee of* 2s. 6d. *will be paid for it, if applied for, by the Corporation*, provided that the child examined has not been under the certifier's professional care, or that of any other medical man, when he or she was absent from school.

b.—Insert name of School.

c.—Christian and surname of the child.

d.—Age in years *last* birthday.

e.—Name of the occupier.

f.—No. or situation of house in street, name of street or building.

g.—Name of disease.

k.—Form III. may be filled up by any Registered Medical Practitioner, but must be paid for by the parent or guardian of the child.

k.—If the certifier is unwilling to certify to what follows, he may strike it out, initialing the correction.

FORM II.—CERTIFICATE OF THE PROBABLE EXISTENCE OF INFECTIOUS DISEASE. (*a*)

I hereby certify that at the request of the teacher of the (*b*)..... School, I have carefully examined (*c*).....aged (*d*).....years, living at the house occupied by (*e*)..... at No. (*f*).....Street, Huddersfield (*k*) and *that I am of opinion that there is reasonable ground to suspect that the child has had a recent illness of an infectious nature*, and that from careful inquiry I am of opinion that there is reasonable ground for suspecting that one or more other inmates of the house have had recently some infectious disease (probably (*g*).. .....). I am therefore of opinion that no child from the above house should be admitted to school until further certified.

(*Signature*)

Dated this.....day of.....18 *Registered Medical Practitioner.*

FORM III.—CERTIFICATE OF RECOVERY FROM INFECTIOUS DISEASE. (*k*)

I hereby certify that (*c*).....aged (*d*).....years, living at the house occupied by (*e*).....at No. (*f*)..... .....Street, Huddersfield, has been under my care for (*g*)..... .....and is now well, and from head to foot free from desquamating cuticle or other sign of recent illness, and I am of opinion that he is now personally free from infection. I also certify (*k*) that the patient's clothes have been efficiently disinfected, and that no other member of the family has contracted the disease, and that he may therefore with safety to the other children of the school be admitted as a pupil in the usual way.

(*Signature*)

Dated this.....day of.....18 *Registered Medical Practitioner.*

N.B.—The certifier is requested to forward this certificate entire to the School Teacher (and if Form II. is the one filled up not by the parent or child). The Teacher receiving and acting upon this certificate is requested to send it to the Medical Officer of Health, at the Sanitary Office, Ramsden Street, filled up as below.

The above certificate was obtained at my request, and has been received and acted upon by me.

Name of Teacher.....

(*Date*)..... (*Name of School*).....

the support afforded by the teachers must all be taken into consideration.

There is obviously less advantage in closing a school, or schools, in a populous district than in a rural and sparsely populated area, because, while you may close the school, you do not prevent the children from playing together in the streets, courts, and alleys.

If the school is open, then there are two centres of infection, home and school, and the points of common contact are much greater than at home, for rapidity of diffusion depends on the means of contact and quantity of susceptible material, which are obviously much greater in a well-attended school than in an ordinary street.

A strong argument against closure is the fact that we lose the knowledge of cases for which no medical man is called in, and therefore not notified, and we thus—in a manner—are at a loss for the thread of continuity, which is supplied by a daily or even weekly list of absentees from school.

Another argument used against closure is that the epidemic has so advanced that those susceptible to the disease will already be infected. This, to my mind, is poor reasoning. I have already pointed out that localised outbreaks of scarlet fever seldom suddenly assume the epidemic form, and that there is unusually ample time for the adoption of preventive measures, but the long incubation period in measles, as compared with scarlet fever, makes it much more difficult, paradoxical as it may seem, to deal with it.

Again, a knowledge of the protected and susceptible material would materially aid one in coming to a conclusion, but this information is not easily available, and can only be guessed at by acquaintance with the history of previous epidemics in the locality.

It is wise on the part of the health officer to guard himself against this closure being courted for other and less legitimate purposes. In two instances (both outbreaks of measles) I have been asked to give certificates for the closure of the schools on account of the small attendance. To this I declined, as the crisis of the outbreak had passed, and therefore closure would not serve any useful purpose.

I have referred neither to private, day, or boarding school, nor do I intend to do so; as much that I have said will apply to the children attending those schools, but several points are worthy of notes. The private day schools are easily dealt with, but the subject assumes much more importance in boarding schools; and here I should like to denounce the reprehensible habit of disbanding the pupils to their respective homes on the appearance of infectious disease, and so carrying infection with them.

The proper plan would be to divide the infected from the apparently healthy in a detached building, if possible, and allow them to return to their homes only after a proper period of quarantine and perfect isolation from the infected.

The Sunday-school is also an element to be considered in the diffusion of disease, for parents whose children have been excluded from the day school fail wilfully, or perhaps ignorantly, to recognise the true meaning of the exclusion and send them to the Sunday-school.

For real progress in the department of preventive work we require the sympathy and intelligent co-operation of the teachers and school attendance officers, for much information may be obtained from them which cannot otherwise reach us, and their assistance will act as a valuable check to the apathy and thoughtlessness of parents and guardians of scholars.

A recommendation then would be that, owing to the absence of any authorised systematic method for the exclusion of communicable diseases from school, much good would accrue from some uniform instructions if pursued by the teachers, and to give practical effect to that recommendation it is necessary that such instructions should be addressed to the School Board authorities by the Educational Department or by the Health Authorities, preferably by the former.

Isolation at Home and in Special Isolation Hospitals as a Means of Arresting the Spread of Infectious Diseases.

Thomas Johnstone, M.D.Edin., M.R.C.P.Lond., M.O.H. for Ilkley.

Let us first consider home isolation. The simple question as to whether or no can cases of infectious diseases be safely and efficiently treated at home is not capable of being definitely settled by a merely negative or affirmative answer, so very much depending on the surrounding circumstances in each particular instance. But that any or all cases of the so-called preventible diseases can be as well and as safely treated in isolation hospitals, and with much greater certainty of being stamped out than at home, hardly admits of any doubt.

In the event of infectious disease breaking out in a cottage containing a large family, or even where the family be small, but the cottage in a crowded street with many children in it, isolation cannot be relied on at home, and the disease will almost certainly spread. This would also apply to such diseases beginning in hotels, boarding-houses, schools, or common lodging-houses. Even in the houses of the well-to-do such diseases as scarlet fever, small-pox, measles, and chicken-pox can hardly ever with certainty be strictly isolated and stamped out, notwithstanding the greatest care may have been exercised. I will quote two cases of scarlet fever isolated in well-to-do houses, and where the premises were disinfected; still the disease spread, in one case, months, in the other, years afterwards.

In one case the patient during convalescence played with a toy in the form of a box. Unfortunately this box was closed during the subsequent disinfection, and remained so for years. Some time afterwards the parents of the patient left their house, and during the general upheaval incidental to the removal, one of the younger children got hold of the box, and within a week was laid up with scarlet fever. In the other cases some children used certain books during convalescence from scarlet fever which should have been burnt; but they were not, and worse, they were closed during disinfection. The parents in this case left the district, prior to which they sold these books at a public sale, and the children who subsequently got them broke down with the disease, and within a week. These results could not have happened if these cases had been removed to an isolation hospital in the first place.

It is not denied that many cases of infectious disease have been completely isolated and stamped out where they have remained at home; but the risks are enormous as compared to hospital isolation. I have seen cases of the most infectious diseases by home isolation so quickly stamped out as even to make one almost think they were not so infectious as they were reported; but these instances are rare, and the world should be governed by rules and not by exceptions.

As an introduction to what I may say on isolation hospitals attention may be drawn to a well-known passage in Leviticus, chap. xiii. and verse 46, where it is written, "All the days wherein the plague shall be in him he shall be defiled; he is unclean, he shall dwell alone, without the camp shall his habitation be." After a continuous connection more or less direct with Ilkley Local Board of Health for nearly twenty years, during which time the presence of infectious diseases has given us the utmost concern, I concur most strongly with the spirit of the above text, and have no hesitation in saying that whenever possible infectious diseases should be removed to and treated at an isolation hospital. Isolation hospitals are of two kinds, permanent and temporary or emergency structures, and I will first deal with temporary buildings.

Temporary or Emergency Isolation Hospitals.—These most certainly do good, on the principle "that half a loaf is better than no bread." But this is not a very satisfactory principle to act on throughout life, and with my present knowledge and experience I would most strongly advise any medical officer of health never to sanction without protest the erection of temporary buildings on account of the following evident and marked drawbacks to their future usefulness.

They are generally built in a hurry and panic, and are never exactly what you want. They are nearly always out of order or needing repair, and although the original cost may be small, it is soon enough augmented by the constant expense in repairs. This is unsatisfactory and irritating to the Board, and causes friction between the Board and its officers. The public faith in them is small, and medical opinion, always critical, may be hypercritical or even actively hostile to them. In buildings not built of stone, or brick and stone, it is most difficult in our climate, subject as we are to such extremes of weather, to maintain an equable and suitable temperature. For the erection of these buildings the Local Government Board refuse, and I think rightly, to advance loans, hence they must be built directly out of the rates.

Permanent Buildings.—These are generally built by loans from the Government, and as they are justly entitled, they cause them to be built after models approved by the Local Government Board and their medical advisers. Any gentleman wishing detailed information on this question I would especially refer to the Tenth Annual Report of the Local Government Board (published in 1882), supplement C. 3,290, containing reports, etc., on "The Use and Influence of Hospitals for Infectious Diseases," and to a subsequent official paper issued by the Local Government Board in 1888, entitled "On the Provision of Isolation Hospital Accommodation by Local Sanitary Authorities."

The powers by which we, as medical officers, act, whenever necessary, in compelling people being removed with infectious diseases to isolation hospitals are found in the various sections of the Public Health Act for 1875.

In addition to the details to be found in the papers referred to, I should like to suggest that your hospital should be large enough to cope with first, the normal or regular demand, and, second, with epidemics or emergencies. I have never known any isolation too extensive. The demand for them will increase. Get your sanitary committees to go for plenty of land to begin with, get as large an administrative block as possible, and, with those two essentials, extensions are easily made when necessary. By all means have plenty of room; for if your capacity fail during an epidemic you will have wasted the money of the ratepayers, inasmuch as you have not supplied what they supposed they had paid for.

In all permanent buildings there should be several small observation wards, because in many cases, though one cannot give a positive diagnosis, one nevertheless feels positive enough about the advantage of having the case taken to the hospital.

Again, whenever possible, some small private paying wards should be built. In my experience there is less fear of, if not more love for, isolation hospitals in the popular mind, and in many cases people are quite willing to pay if improved accommodation can be obtained, and this feeling should be fostered. The question as to who should be the medical attendant to these infectious patients is an important one. It is hardly to be expected that medical men in general practice would encour-

age their best patients to go to an isolation hospital to be attended by another doctor, and the general practitioner be deprived of his fees. And unless some plan of meeting this difficulty be found, a stumbling-block will be placed in the way of the development and usefulness of isolation hospitals. As a simple solution of this point, I would suggest, first, in towns large enough to bear the expense, the medical officer to the hospital should be a Government or corporation official, not necessarily the medical officer of health; he should not be allowed general practice, but become the specialist on fevers in the district and do consulting work. In smaller towns the medical officer of health should do the fever hospital work and consulting work as a fever specialist, but not to indulge in general practice. In villages each medical man should attend his own patients, though the general supervision of the hospital may be under the medical officer of health.

There seems no reason why patients who can pay for medical attendance should not be made to do so. In all cases where fees are paid, one-half should go to the general practitioner who in the first instance notified the case, and the other to the credit of the hospital. The question as to who should pay and who should not would be difficult to settle. The doctor who originally notified the case and the medical officer to the hospital might probably solve this question in particular cases.

An ideal isolation institution would have a special hospital for each of the so-called preventible diseases in its own grounds, and this is what should be aimed at. Further, if the recent history of these institutions be any guide to their future development, a great differentiation of them will soon be brought about. The popular mind is becoming very sensitive on sanitary matters, and this will materially help in carrying on the good work.

There is no doubt that the infectious diseases vary greatly in their infective power, and though certainly it would be better and safer for the community to have them all treated at isolation hospitals, some there are that might, with fair hope of success, be treated and completely stamped out at home. Wherever there is reason to suspect the sanitation of any house in which any case of infectious disease exists, that case should with all possible speed be removed to an isolation hospital. Under the present state of the law the collateral circumstances should help to decide as to whether a particular case should or should not be removed to an isolation hospital.

The question of the prevalence of infectious diseases in the vicinity of, but outside infectious hospitals, is variously answered. The Fulham inquiry seemed to answer affirmatively; but Dr. Robertson, of Liverpool, who has had many years' experience in the supervision of infectious hospitals, writing me on this point, says his experience is against the Fulham Inquiry. There seems no reason, with due care, thorough disinfection, and ample space, why such diseases should be carried outside the hospital grounds.

The question of how long particular cases of infectious disease should be isolated is one of prime importance, and great blame is necessarily attached to anyone allowing a patient to return home in an actively infectious state. It is better to be guided by a subsidence of the disease and a complete disappearance of any of its indications, than to think of acting on any fixed rule as to time. Of course, thorough disinfection at the home on the removal of the patient, and great care that no infected clothing be brought from the hospital, should at all times be insisted on.

History of the Ilkley Isolation Hospital—The attention of the Board was drawn to the need of such a building in 1876, and subsequently an arrangement was made with the Bradford Fever Hospital (which was then a private institution), to enable cases of infectious diseases occurring in this district being taken to Bradford. When the Corporation of Bradford acquired the isolation hospital they refused to take cases from the outlying townships. This fact, together with failure to efficiently isolate a case of scarlet fever, necessitated the Ilkley Local Board erecting an isolation hospital of a temporary kind during the year 1888. Annually, in my report, attention was drawn to its inadequacy, and during 1893, when small-pox was imported from Bradford, it became evident that more accommodation was required. Finally, a permanent building was decided on. Land has been bought, and the necessary money will be borrowed to erect a fully equipped institution.

Our temporary hospital has been open five years, and its effect in reducing the mortality from scarlet fever is marvellous, and when it is remembered that this is one of the most fatal of the infectious diseases, this result is most encouraging. From 1874 to 1879 there were 12 deaths from scarlet fever; 1879 to 1884, 5; 1884 to 1889, 11; 1889 to 1894, 1. When it is considered that the population has more than doubled during the time, such a result is highly gratifying and amply justifies the existence of our hospital, and the increased expenditure contemplated in our permanent building. It is ten years since we have had an epidemic of scarlet fever, which may be ascribed to the fact of our being able promptly to isolate those cases in our hospital as they become imported to us from other parts of Britain.

During the five years' existence of our hospital over 70 patients have been treated there, and over one-third of these were visitors to the township who brought their respective diseases with them.

All the ratepayers are admitted free of charge; the visitors pay according to circumstances. Patients have their own doctors, and whenever extra help in the form of trained nurses is required, it is, after a consultation with the doctor of the

patient and the medical officer of health, supplied at the expense of the board.

Last summer a case of small-pox was imported in our convalescent hospital, where there were over 100 inmates; but by early recognition and prompt isolation the disease was stamped out and not allowed to spread.

With the Notification of Infectious Diseases Act and an efficient isolation hospital we are well armed to arrest the progress of epidemic disorders.

I advise all medical officers who don't possess an isolation hospital annually to ask for one. If their sanitary committee be intelligent and right-minded, they will get one; if not, probably a "blessing in disguise" in the form of an epidemic will "force" what reason did not procure.

Mr. Alderman Fraser and Mr. Councillor Cohen having spoken, it was unanimously resolved that discussion on the papers read be adjourned until the next meeting, the former, as a member of the profession, expressing a wish that he might be present in order to hear the various opinions thereon.

The following vote of condolence with the widow of the late Dr. J. Burnley Walker was unanimously passed, viz.: "That this meeting of the Yorkshire Branch of the Incorporated Society of Medical Officers of Health desires to express its sympathy with Mrs. J. Burnley Walker on the death of her husband, who was a valued member and officer of the Branch, and that a copy of this resolution be forwarded to Mrs. Walker."

Resolved, "That the best thanks of the Branch be given to the Right Worshipful the Mayor of Hull for his hospitality and kind welcome to Hull, also to Mr. Alderman Leak (Chairman Property Committee), for granting the use of the Council Chamber for the purpose of holding the meeting.

During the afternoon, through the kindness of the Chairman (Mr. Alderman Fraser) and members of the Hull and Goole Port Sanitary Authority, the members of the Society were conducted over the hospital ship, which has been equipped for the reception and treatment of cases of infectious disease by the Port Sanitary Authority.

Certain places having been selected, it was resolved that the arrangements for holding the next meeting be left in the hands of the President and Secretary.

PROCEEDINGS OF THE NORTH-WESTERN BRANCH OF THE INCORPORATED SOCIETY OF MEDICAL OFFICERS OF HEALTH.

THE ordinary meeting of this branch was held at the rooms of the Chemical Club, Manchester, on Friday, March 9th, at four p.m. Present: Drs. Paget (president), Adams, Anderson, W. H. Barr, Etches, Graham, Kenyon, Littlejohn, Park, Pilkington, Porter, Rhodes, Sergeant, Steeves, Stephenson, and Vacher. Dr. Robinson and Mr. Westmacott were present as visitors.

A letter was read from Dr. Tatham resigning his membership of the branch owing to his having left the province to take up the duties of his office in London.

A letter was read from Dr. Wheatley, regretting his inability to be present at the meeting.

A letter was read from Sir F. S. Powell with reference to the re-introduction of his Bill to amend the Public Health Acts with respect to the regulation of common lodging-houses. The hon. sec. was instructed to reply.

A letter was read from the hon. secs. of the Incorporated Society of Medical Officers of Health relating to certain subjects which had been referred by the council to a sub-committee for consideration and report—the sub-committee to consist of the president and hon. secs. and hon. solicitor, and the president and secretary of each branch. The writer suggested that the representatives should come prepared to bring forward the views of their several branches, and with this object the communication was laid before the branch. The representatives were instructed accordingly.

The following nomination was read: Alfred Taylor, F.R.C.S.Edin., L.R.C.P.I., L.F.P.S., D.P.H., M.O.H. Little Lever U.S.D. Proposed by the HON. TREASURER, seconded by the HON. SECRETARY.

The following resolution was proposed by Dr. STEEVES, seconded by Dr. VACHER, and carried unanimously:—

Resolved—"That the members of the North-Western Branch of the Incorporated Society of Medical Officers of Health, fully recognising the great importance of an efficient system of registration of plumbers, are of opinion that such registration should without delay be placed on a firm legal basis by Act of Parliament."

It was further resolved—"That a copy of the resolution be sent to the hon. members of the branch and to Mr. Lees Knowles, M.P., and that a memorial be sent to the President of the Local Government Board praying that the Plumbers' Registration Bill about to be re-introduced may have the support of the Board."

The PRESIDENT said that the debate on "The Administration of Small Infectious Hospitals" would now be resumed.

Dr. W. H. BARR said that he had experience of trying to obtain a hospital in conjunction with neighbouring districts by means of a joint committee. The attempt had not succeeded, so that he was still without a hospital, and the notifications he received of fevers were comparatively of little use. When a hospital was established the administrative power should be in the hands of the sanitary authority, working by means of a sub-committee. The engaging and dismissing the staff should be part of the duties of this sub-committee. It was not always the best arrangement to appoint the medical officer of health as superintendent.

Dr. ETCHES said it seemed to him that the more important consideration in the management of small hospitals was the difficulty of dealing with two or more infectious diseases

at the same time. Where there were three separate erections beside the administrative block, and nurses for each, there was no occasion for fear; but if only one building was provided, it was a question whether more than one disease could be treated at the same time with safety. The hospital at Macclesfield was an erection divided into two wards by a kitchen and nurses' bedroom, and thus not adapted for the treatment of cases of two diseases simultaneously. He hoped that better hospital accommodation would be given in the future. Meanwhile he had to do the best with what he had and he proposed to ask the meeting for advice on a few points. First, should small-pox take precedence of scarlatina? In the spring of 1893 there were a few cases of small-pox, and upon the appearance of the disease the authority were obliged to send three or four disquamating cases of scarlatina to their homes, and attempt precautionary restrictions there. When the small-pox cases (seven) had left hospital it was thought best to keep the hospital ready for more, as small-pox was still in neighbouring districts. After six weeks' waiting scarlatina was again received, and from June to December fifty cases were treated in hospital. Should small-pox thus be given precedence of scarlatina? Could it be treated safely in the same building? Should the scarlatina convalescents be vaccinated and allowed to remain, all communication between the two wards being stopped? If so, what is to be done as to outdoor exercise? Are the small-pox convalescents to be allowed to go out in the enclosure for an hour in the morning, and the scarlatina children for an hour in the afternoon? As regards visitors, they should not be allowed unless the patient is dangerously ill, then a wife or mother may be allowed in, be lent clothing, and allowed to act as watching nurse, but only if she is protected from taking scarlatina by a previous attack, or from small-pox by submitting to revaccination. By means of the telephone relations can hear how the patients are doing from the medical officer of health. In a small hospital a man and wife of middle age might be appointed as porter and caretaker, but Dr. Anderson and others were opposed to this arrangement. Doubtless a fully-trained woman from a large infectious hospital was the best resident head of the house, but a porter was necessary, and he must live on the premises. The medical officer of health should select the matron, and have power to dismiss her, and anyone employed at the hospital. As to medical attendance, in small hospitals the only way is to make it optional. It is convenient to have printed at the bottom of the notification form the questions: Is the above a proper case for removal to hospital? If so, do you wish to attend the case yourself?

Dr. SERGEANT was glad to remember that it was owing largely to the action of Lancashire, that the Isolation Hospitals Act had been obtained. Action had been taken for securing the formation of hospital boards on the instigation of the County Council. All who pay rates are entitled to hospital accommodation, and this should be good enough for anyone. It was important the area to be made use of should be big enough. It was not satisfactory to deal with more than one disease under one roof. Small-pox should be treated in wholly separate hospitals. The district medical officer of health should be the responsible medical superintendent, and have power to dismiss the nurses. He should be responsible even when the patients are attended by private practitioners, who must conform to rules laid down. Relatives of patients should be afforded facilities for obtaining information as to patients' progress, and for seeing patients. Sufficient nurses ought to be provided. Patients ought never to be left. Thorough disinfection on leaving hospital was most important. In many cases it was better to destroy clothes altogether. Charitable societies would often find warm clothing for children when they were ready to leave hospital. What to do with excreta from hospital patients was often a difficult question. The best way might be to provide a miniature sewage works, and treat the whole there. Typhoid stools were exceptionally dangerous, and should be conveyed in covered vessels and burned.

Dr. PILKINGTON agreed with the opinion just expressed that a small-pox hospital should be altogether separate from the hospital for treating other infectious diseases. As to management, no doubt the medical officer of health should have complete control. He was strongly opposed to making any charge for patients. The accommodation should be free, and so good people would be encouraged to make use of it.

Dr. KENYON was not in favour of the medical officer of health being made medical superintendent of the infectious hospital. There might be places in which this arrangement appeared necessary. In most large districts and in many small ones it was better to appoint a practitioner living near the hospital and pay him adequately.

Dr. VACHER accepted the definition of a small hospital as any hospital not large enough to employ a resident medical officer. All such hospitals were under a great disadvantage. The resident head should be a lady trained as a nurse, and nurses, porter, and female servants should be under her as far as practicable. The medical superintendent might be the Poor Law medical officer for the district or any practitioner living near the hospital. He should be paid properly, and a deputy should be appointed to be available during his absence. No hospital should receive cases of two different diseases under the same roof simultaneously. Each disease should have a separate pavilion, and the small-pox pavilion should be on a different site. The ventilation and heating of wards was often a difficult problem. If attention were given to this matter when the hospital was being constructed it would be well to make arrangements for ventilating with warmed air. The arrangement at Stockport for advising friends as to the condition of patients appears almost perfect. In most well-regulated hospitals some provision was made for patients being seen through a window or glass screen. Too much attention could not be given to seeing that patients were properly disinfected when discharged. The patient should come out of his final bath into an apartment never used but as a dressing-room for patients about to leave the hospital. The sanitary accommodation best suited for an infectious hospital would depend on where the hospital was. Where water-carriage was available water-closets might be provided, but stools should be efficiently disinfected before being discharged into the sewer. Earth closets were in many respects less satisfactory, and liable to cause a nuisance. The safest way of dealing with infectious excreta was doubtless by cremation, but it was not always practicable.

Dr. ADAMS said he sympathised with what Drs. Kenyon and Vacher had said. Making the medical officer of health hospital superintendent increased his difficulties and anxieties. At Bolton a general practitioner had claimed that he had a right to visit a hospital patient attended by Dr. Adams without consulting him. As regards infectious stools, they were received in glazed earthenware tubs, treated with sulphuric acid, and burned in Dr. Sergeant's apparatus. Few small hospitals had an observation ward (for receiving doubtful cases), though such a ward was often required. At the Bolton Hospital there was no accommodation for the porter, and he had to live outside. No hospital should be without a room to be used for dressing patients prior to their discharge.

The PRESIDENT, in concluding the discussion, said it had been by no means the least interesting or useful one during the session of the branch now drawing to a close. They were all very much indebted to Drs. Anderson, Sidebotham, and Porter for opening it, and for the able manner in which they had done so. The class of hospitals that they had been discussing were those for which a resident medical superintendent could hardly be appointed. It had, therefore, been advantageous to consider the relative merits of patients in such hospitals being treated by their own regular medical attendants, or by a medical officer of health who had been appointed medical superintendent of the hospital. There had been marked differences of opinion on this point. For his part he was inclined to think that this question might be best settled by local considerations and circumstances. While not prepared to disagree with the opinion that the medical officer of health of a small district should be definitely

appointed medical superintendent of the hospital and treat the cases within it, he could not but remember that his Kendal experiences were very satisfactory. In that place he was medical superintendent of the hospital, and responsible for its management, but the patients in it were treated by their own medical men. The plan, so far as he knew, had always worked well there. He was also very strongly of opinion that if the medical officer or medical superintendent were also a private practitioner he ought not to be the medical attendant in hospital of other practitioner's patients. He specially commended Dr. Porter's form as to the condition of patients in an isolation hospital, which was to be kept posted up in the office of a sanitary authority, and filled up day by day. It appeared to him to be as nearly perfect as possible, and would possibly be adopted in Salford in place of that at present kept in the health office. He passed round some forms in use in Salford as to the admission of friends of patients to the hospital, and regretted that indisposition prevented Dr. Mullen from being present to give further details as he had hoped to.

Ladywell Sanatorium,
Eccles New Road, Salford.

NOTICE.

The nearest relatives of patients can call daily to inquire as to their health between the hours of seven and eight p.m.

Owing to the extreme danger of visitors conveying infection from the wards, only those patients who are dangerously ill will be allowed to be visited, and then only by the two nearest relatives.

Visits to patients will be limited in duration to five minutes except in very urgent cases, when, by special permission, the duration of the visit may be extended.

Visitors will be required to wear a wrapper, which will be provided at the hospital, to cover their dress whilst in the wards, and to wash their face and hands before leaving the hospital.

Visitors are warned against entering the wards when in ill-health, whilst exhausted, or with an empty stomach, against touching the patient, or exposing themselves to his or her breath, or sitting on or near the bed, or handling the bed-clothes.

In the event of a patient becoming dangerously ill, notice will be sent to the nearest known relatives.

Any visitor bringing in food of any description will not be allowed to visit the wards again.

Visitors are strongly urged not to enter any tramcar, railway carriage, or other public conveyance until some time has elapsed after their leaving the hospital.

The Medical Superintendent can be seen daily between the hours of one and two.

JOHN W. MULLEN, Medical Superintendent.

Dr. SERGEANT proposed Sir George Augustus Pilkington for the honorary membership of the branch.

The nomination was seconded by Dr. BARR.

The HON. SECRETARY said the name would be put in the notice paper, and the election could take place at the next meeting.

Dr. ANDERSON referred to the case of Dr. Eason, of Lytham, a zealous and active medical officer of health of considerable experience, who was not likely to be reappointed by his Sanitary Authority. He moved the following resolution, which was seconded by Dr. ADAMS and supported by Dr. SERGEANT: "That this branch expresses its sympathy with Dr. Eason, medical officer of health for Lytham, and member of this branch, and deeply regrets that his Authority has failed to reappoint him without assigning any valid reason therefor. The branch takes this opportunity of again recording its sense of the urgent need of security of tenure for medical officers of health."

This resolution was passed unanimously, and the hon. secretary was instructed to send a copy to Dr. Eason.

(End of Proceedings of the Incorporated Society of Medical Officers of Health.)

CORRESPONDENCE.

To the Editor of PUBLIC HEALTH.

SIR,—While rejoicing, as we must all do, that the step has been taken by the Society of approaching the Local Government Board on the subject of vagrancy in connection with disease, and heartily endorsing the general tenor of the resolutions approved at the February meeting, I much fear that the suggested medical inspection of tramps immediately on admission to casual wards and common lodging houses would often be found impossible in practice in small country towns, where the medical officer of health usually receives only a nominal salary, and has often to rely on private practice for an income. A man so situated would frequently find it difficult or impossible to visit the various lodging-houses, etc., in his district, perhaps a considerable distance apart, at the proper time. If, however, all tramps had to carry tickets, and the ticket of a tramp who had been in contact with infection were endorsed to that effect, the necessity for such inspection would be to a large extent avoided, because any bearer of an endorsed ticket would be kept apart from the others as a matter of course. And, whatever precautions are taken in times of epidemic, it must sometimes happen that an inmate of a casual ward or lodging-house will wake in the morning ill with symptoms which may turn out to be those of the prevalent disease, and the question will arise of what is to be done with those who have slept in the same room. I do not believe that Parliament would sanction their compulsory detention for a long incubation period if there were any other way possible of dealing with the case. Besides the hardship it would sometimes cause and the expense, the providing of a suitable place of quarantine and the necessary officials, would often be an insuperable obstacle. All such difficulties would be avoided by a ticket system, which, I think, tramps would not be so likely to try to evade by changing cards, etc., as was suggested by some gentlemen at the January meeting. But such tricks might easily be made impossible by adding to their descriptions one or two simple measurements on the Bertillon system, *e.g.*, the length of the left middle finger and foot.—I am, etc.,

C. GORE RING, M.O.H. Keswick.

Keswick, March 28th, 1894.

Re SUBSCRIPTIONS.

To the Editor of PUBLIC HEALTH.

SIR,—Subscriptions to the Society became due on October 1st. I shall feel obliged if the Fellows, Members, and Associates, who have not yet paid, will forward me their remittances without delay.—I am, etc.,

S. R. LOVETT,
Hon. Treasurer.

Great Russell Street, W.C.,
March 29th.

ERRATUM.—In Dr. Vacher's remarks on page 167, column 2, line 5, of the last issue of PUBLIC HEALTH, instead of "syphilitically healthy infants," read "typically healthy infants."

Public Health.

IS PREVENTIVE MEDICINE CAUSING RACIAL DEGENERATION?

Dr. Haycraft's Milroy Lectures open up a wide field for discussion and speculation. The summary of his conclusions, which is given on page 231, makes it clear that in his opinion sanitation is an enemy of the human race, however beneficial it may be to individual members of the race. With these conclusions we almost entirely disagree. If the evolutionary theory (which is after all only a working hypothesis, though one of far-reaching importance and scope) and the natural selection which forms a necessary element in it, involve this conclusion, then so much the worse for the hypothesis. We do not believe, however, that either natural selection or the facts of the case justify such a conclusion.

Dr. Haycraft discusses race-deterioration as affected by the diminution of such acute infective diseases as measles and scarlet fever, and as affected by the diminution of chronic infective diseases like phthisis. The former diseases are regarded by him as to a large extent "race improvers." The weakly are more likely to die from them than the strong; consequently a larger proportion of the strong survive to become the parents of the next and more robust generation. This, however, is a one-sided picture. The family practitioner of large experience will paint it in very different colours. For although weakly children are more likely to die of measles, etc., than the strong, it is equally true that a large number of robust children are left debilitated, and possibly permanently damaged by these diseases. On which side does the balance rest? Assuming that it is desirable that weakly children should be killed by infectious disease (a Spartan-like doctrine which Dr. Haycraft carefully disowns), is it not equally true that the race would be improved by the total annihilation of these diseases, and the consequent prevention of the survival of large numbers whose health has been permanently injured by non-fatal attacks?

Then take the case of phthisis. We may admit that the life of phthisical patients is much more protracted than formerly, and that the proportion of cures has increased. But is it not equally true that fewer persons become phthisical than formerly? With a diminution of the active cases of phthisis, the number of centres for desiccated infective sputum must have diminished to a corresponding extent. Of the fact that the predisposing causes of phthisis—damp and overcrowded houses, ill-ventilated workshops, etc.—are steadily diminishing there is evidence on every hand. It is therefore reasonable to suppose that much at least of the deteriorating effect of survival of tubercular persons is counterbalanced by the large number of persons who are prevented by improved sanitary and social conditions from becoming tubercular. Dr. Haycraft appears to think that even were the tubercle bacillus to disappear, the phthisical type would remain and be predominantly fertile, and the race would suffer in consequence. But while freely admitting the importance of constitutional predisposition, is it not probable that the type will tend to disappear as the victims from phthisis steadily decline?

Even assuming the accuracy of Dr. Haycraft's data, the remedies recommended by him are in a large measure impracticable. The compulsory permanent segregation of criminals and others, whom it is undesirable to allow to reproduce their kind, is as impracticable as compulsory castration. More may be hoped from an enlightened and educated public opinion on the question of marriage, though progress in that direction must be slow and slight. Assuming that these remedies are, and will continue to be, inoperative, are we to fall back on the alternative course, and allow the uninterrupted action of natural selection, burning our fever hospital, and restoring our midden-heaps and slums? If the well-being of the race requires this, medical officers of health and their colleagues in public health work will cheerfully commit the "happy despatch"; but they will require more positive and accurate proof that the race *is* degenerating before they proceed to this last service for humanity.

(Other contributions on this subject will appear next month.)

Dr. Reginald Dudfield, Medical Officer of Health for Eastbourne, has been appointed to the important post of Medical Officer of Health of the Parish of Paddington.

The Buda-pesth Congress.—The following gentlemen will officially represent the Incorporated Society of Medical Officers of Health at the International Congress of Hygiene and Demography at Buda-Pesth: Drs. H. A. Armstrong (Newcastle), W. H. Corfield (London), Mumby (Portsmouth), Newsholme (Brighton), Peachey (Wantage), Porter (Stockport), and Thresh (Essex).

The Co-operative Trip to Buda-Pesth.—The arrangements for this trip, which were stated in outline in last month's Public Health, are being rapidly completed. Further particulars will be given hereafter, and every member of the Incorporated Society of Medical Officers of Health will receive a circular stating the full details. The names of those already sent as probable members of the party comprise influential health officers from various parts of the country and members of the medical department of the Local Government Board. All inquiries should be addressed to the Editor of Public Health, or to Dr. Lunn, 5, Endsleigh Gardens, N.W.

RECENT RESEARCH.

On the Disinfecting Power of Solar Rays.

Certain articles, as furs, leather, etc., cannot be disinfected by steam, since they are thereby rendered useless. Others, which are certainly amenable to such treatment, as fixed upholstered articles of furniture, cannot be removed for the purpose. To disinfect these we have recourse to gaseous agents, and they, according to the results of experiment, are not always reliable. An exception, possibly, lies in formalin, which has recently been recommended by Lehmann ("Münchener Med. Wochenschrift," 1893, No. 22). Another means of disinfecting such articles consists in the use of solutions of carbolic acid or corrosive sublimate. In the case of wooden and metallic articles, with smooth hard surfaces, we can rely on the result, if they are first thoroughly sprayed with the liquids and subsequently washed; but such is not the case with thick woollen materials. Duclaux ("Rev. Scientifique," 1881) found that some bacteria are destroyed by sunlight, and he refers to this as an important agent in the sterilization of the atmosphere. Arloing ("Compt. Rend.," 1885) proved that anthrax bacilli are destroyed by the solar rays. Koch has also shown that tubercle bacilli cannot be exposed to the same for very long and survive. Fermi and Celli ("Centralblatt für Bacteriologie," Vol. xii., No. 18), in a series of experiments, demonstrated that germs in aqueous suspension are likewise killed, and Raspe ("Dissertation Schwerin," 1891) asserts that the sun is able to hinder the development and even destroy bacilli lying on the surface of the soil or submerged in water. But no experiments have been hitherto made to determine how far these rays may be used as disinfectants of clothes, bed linen, and furniture.

It is a common custom to place the clothes, bed linen, and mattresses in the air and sun, especially after death, possibly in the hope that currents of air may diffuse evil odours more quickly. Nevertheless, it seemed of importance to the author to investigate how far such results were trustworthy, and how far they were attributable to the direct effect of the solar rays.

Esmarch used pillows, varying the contents, skins, etc., and bacteria, as pure cultures, or pus containing micrococci. He imitated the natural conditions as far as possible. The materials were contaminated with the solutions and placed in the sun, either at once or after drying. Control experiments were also made. He arranged linen, wool, cloth, etc., in layers, and in the first series of experiments to prevent the falling of atmospheric microbes during the exposure, he placed the pieces in a box covered with a glass pane, and provided at the sides with openings for ventilation. The temperature of the interior, however, rose much higher than that of the air (30°) and vitiated the results. In subsequent experiments the objects were always placed on the grass in the sun. Esmarch concludes that the sun's rays have a marked action on the surface, but that this speedily becomes lost when bacteria are protected by layers of material. The cholera bacillus, even in the deepest layers, was killed; but this is not surprising since dessication lasting but a short time is fatal to it. An exposure lasting eight to ten hours yielded but unsatisfactory results. After one day the diphtheria bacillus was killed in the interior of the pillows, but when protected by the woolly hair of a sheep's skin, 39 hours were insufficient. Streptococci within the pillows and the skins withstood a five days' exposure. Esmarch then sprayed infected articles thoroughly with 2 per cent. and 5 per cent. solutions of carbolic, and found that the weaker acid is little better than the sun, and that the 5 per cent. is not altogether reliable. (Ueber sonnen desinfection, E. Von Esmarch. "Zeitschrift für Hygiene," Vol. xvi., Part 2.)

Formalin in the Diagnosis of the Typhoid Bacillus.

Schild narrates the history of a typhoid epidemic which occurred at Seehausen, near Mageburg, last autumn. Certain features of the epidemic are very interesting. On October 10th three samples of water—A, B, and C—were sent to him to examine for typhoid bacilli, and he found them in A and B, along with bacterium coli. Seehausen is a small town of 3,000 inhabitants, lying in a fruitful valley on chalky soil, in a situation at one time covered by a lake. Typhoid occurs in the place every year. In this epidemic last September, which covered a very small area indeed, there were 33 cases and two deaths. Schild gives a plan of the houses attacked, the situation of the wells, and the course of a small stream. In one house, supplied by the well B, there were 20 patients. No cases occurred in connection with well C. How were the wells contaminated? They were but a few feet distant from the open watercourse, and a means of communication existed between the latter and the two wells. In consequence of the drought of the foregoing summer the ground water had sunk very low, and the level of the wells was much below the normal, so that the flow of water from the stream to the wells was favoured. The author believes in Gaffky's view, that typhoid epidemics arise by the communication of sinks and leaking sewers with wells; in this way a possibility is opened for contamination of the wells with typhoid discharges. The author refers to the diagnosis of the typhoid bacillus by means of formalin. He added formalin to nutritive media, and observed the growth of the typhoid bacillus, of bacterium coli, and the water bacterium. Typhoid bacilli will not grow in gelatin containing formalin in the proportion of one in 13,000. Such a strength has no effect on the others. Schild used

formalin-bouillon 1 7,000 as a diagnostic agent. If it remains clear, the bacterium coli and water bacterium are certainly absent. (Schild: Eine Typhus-Epidemie mit nachweisbarer Enstehungsursache und die Diagnose des Typhus Bacillus mittels Formalin. "Zeitschrift für Hygiene," Vol. xvi., Part 2.)

THE ACTION OF SOAP ON CHOLERA GERMS.

Jolles used potash soap, potash-lysol, glycerine, and shaving soap. Ten solutions of each were prepared, ranging from 1 to 10 per cent. strength. Cultures of cholera germs were added to 100 c.c. sterilised solutions of soap. After varying intervals —10, 30, 60 minutes, six, 24 hours, etc.—portions were removed and introduced into nutrient gelatine. The author found that the several kinds of soap, under like conditions of experiment, as temperature, length of time, and strength, vary very little in disinfecting power. As an example, the potash soap of 5 per cent. strength, at 15° C. and an action of three minutes, showed considerable antiseptic power; an 8 per cent. solution sterilised perfectly. With an action lasting 30 minutes, a percentage of 0·8 killed the cholera germs completely. ("Zeitschrift für Hygiene," Vol. xv., Part 3.)

SANITARY WORK IN THE COUNTY OF SHROPSHIRE.

To the incomplete review of the reports of county medical officers of health, given in last month's PUBLIC HEALTH, must be added a few remarks on the annual report of Dr. W. N. Thursfield, the medical officer of health to the county council of Shropshire. Dr. Thursfield is executive medical officer for 25 districts, embracing an area of 1,250 square miles, and a population slightly over 200,000, in addition to his appointment as administrative medical officer to another county, viz., that of Shropshire.

The vital statistics for the whole county of Shropshire compare very favourably with those of England and Wales, the death-rate being 17·1 as compared with 19·1, the zymotic death-rate 0·8 as compared with 1 9, and the infantile deaths per 1,000 births, 114 as compared with 148.

Diarrhœa appears to be the most fatal zymotic disease in the county; and yet even as regards this, comparisons are much to the advantage of Salop. Thus in 1892 the death-rate from this disease was 2·5 per 10,000 of population in Shropshire, while it was 17 in England and Wales as a whole, 18 in urban districts, and 16 in rural districts of England and Wales. Dr. Thursfield adds the following remarks, with which we heartily agree:

> Many cases of diarrhœa are in no sense zymotic or communicable, or dependent upon local causes. The autumnal diarrhœa, most prevalent in hot weather, is probably the most direct expression to be obtained from vital statistics of the accumulation of decomposing filth within or about dwellings, or of the filth-sodden soil surrounding them.

BACTERIOLOGY AND PATHOLOGY.

Diphtheria and other Pseudo-membranous Inflammations is the title of a very useful and important study by W. H. Park, from the Pathological Laboratory of the College of Surgeons and Physicians, New York. In an analysis of 154 cases diagnosed clinically as diphtheria, Baginsky found the Klebs-Loeffler bacillus in 120; in 200 suspected cases, Martin failed to find the bacillus in 72; in 17 out of 30 cases Koplick found the bacillus to be absent; lastly, Park, in an analysis of 159 cases, diagnosed as probably diphtheritic, the bacillus was found in 56 cases. The organism most completely associated with the bacillus in the true cases of diphtheria, and likewise most commonly present in the pseudo-membranes (and especially in scarlet fever cases) is a streptococcus. Park lays great stress upon the advisability of separating the pseudo-membranous from the true cases of diphtheria, basing his reasons upon the proved toxic action of the diphtheritic bacillus as opposed to the streptococcus. He draws attention to the fact, observed by Koplick, that there may be very little exudation in the case of true diphtheria, and that the symptoms may be slight, yet the case may prove highly infective. He rightly insists on the necessity of an early diagnosis, and of the isolation of the patient until the diagnosis is made. The diagnosis can only in the early stages be made by a bacteriological examination, and for this purpose he strongly recommends blood serum three parts and peptone glucose broth one part. The medium is sterilised and stiffened at a temperature just below 100°C. Inoculation is made with a sterilised swab of cotton wool, kept ready for the purpose, and the tubes incubated at a temperature of 37°. After twelve hours the growth may be examined.

The Ætiology of Appendicitis.—Hodenpyl* gives the results of the bacteriological examination of his own and recorded cases of appendicitis, in all thirty-five cases. In thirty-two of these the bacillus coli communis was alone isolated. He contrasts this with the very great frequency of the presence of this bacillus in the exudation in the peritoneal cavity in all cases of lesion of the intestinal wall. Concerning our knowledge of the pathogenicity of this bacillus, he mentions the fact that the bacillus taken from the fœces is much less virulent than that isolated from cases of peritonitis.

Cholera.—Professor Klein, in the current number of the "Zeitschrift für Hygiene," tabulates the characteristics of the cholera bacilli which he obtained from cases in different parts of the country. Microscopic preparations of the contents of the intestine were in the majority of cases typical, the general characters of cultures positive, the indol reaction characteristic; in the vast majority of cases gelatine was liquefied, and in most cases

* Hodenpyl, New York, Med. Jour., Dec. 30th, 1893.

there was no growth upon potato; in the majority of cases milk was curdled. In the same Journal Pfeiffer has a long paper upon the ætiology of cholera. He draws a distinction between temporary and permanent immunity. The former, he maintains, can be produced by every substance which gives rise to a temporary increase in the number of leucocytes, either in the peritoneum or in the blood. He thinks that this will explain the immunity obtained by Klein against cholera, by the injection of cultures of other organisms. The permanent immunity is that obtained by injecting attenuated cultures or their products, or the serum of animals rendered immune. Issaeff follows the preceding with a still longer paper on artificial immunity against cholera. He concludes that the intraperitoneal or subcutaneous injection of normal human blood serum, of various acids, of various alkaline and neutral fluids, give to guinea-pigs a certain amount of immunity against cholera. Guinea-pigs so treated show no immunity against the toxines of the bacillus. The blood of immune guinea-pigs possesses very strong immunising properties, and in certain senses healing properties. Similarly the blood of cholera convalescents possesses about the third week immunising properties. The cause of the temporary immunity after the injection of various substances is due to the cell reaction, to phagocytosis. Federoff* demonstrates the immunising power of the defibrinated blood of rabbits which had been rendered thoroughly immune against cholera. He finds that ·01 cm. is sufficient in the mouse to produce immunity.

The Spontaneous Purification of Rivers.—Professor Duclaux gives an interesting summary of our knowledge of the most important subject in the current number of the "Annales de l'Institut Pasteur" He calls attention to the well-known fact that in spite of the enormous quantity of organic matter and micro-organisms, for instance, passing into the Seine from Paris, whilst a short distance down stream a great purification has taken place. The causes for this he arranges under several heads. Firstly, physical causes, such as sedimentation, and the mixing with purer water filtering through the banks of the stream. Secondly, chemical action, oxidation in the presence or absence of light, the struggle amongst the bacteria, of which the more aerobic and therefore the less harmful survive. Buchner demonstrated that if the bacillus pyoganeus typhosus or coli were introduced into still water the first multiplied rapidly whilst the latter two died after two or three days. In moving water, Schmidt found cholera and typhoid bacilli multiplied as in still water, but the anaerobic perished. Duclaux disputes the observations of Loen that algæ and diatomaceæ (chlorophyll plants generally) render water purer, he simply regards their presence as demonstrating that the water is pure.

* Zeitsch f. Hygiene, II 3, 1893.

ANALYTICAL NOTES.

Sir Charles Cameron, in his presidential capacity, gave an excellent address at the annual meeting of the Society of Public Analysts, in which he surveyed the rise and progress of the analytical chemist. He reminded them that when he was a student, the analytical chemist, as a distinct profession, was unknown; most of the commercial analytical work being carried on in the laboratories of professors and lecturers. He marked the rapid development of the chemist as a distinct profession from a generation ago, when the importation of guano and the establishment of artificial manure works gave a great impetus to analytical work, then followed the passing of the first Adulteration Act in 1860, followed again by a more efficient one in 1872. He congratulated them on their advance in status, and approved of the proposal that some qualifying degree or diploma should be established and required from those chemists who offered themselves for official positions, and suggested that the Society of Public Analysts would be a proper body to grant such diploma.

Apropos of qualifying examinations for chemistry, opinion is not at all unanimous as to their usefulness as an index of proficiency. It is notorious that, although a university training is certainly a good mental discipline, our ablest chemists are those whose careers have been singularly devoid of university influence. A society to represent the profession, in which all worthy members should be enrolled by ballot, serves purposes of undoubted utility, but even this is not so necessary in chemistry as in other professions, inasmuch as it is an exact science.

The question of the amount of phenols in carbolic powders is once more being discussed. No method for their valuation, at once simple, rapid, and accurate, is yet extant; such simple methods as advocated by some carbolic powder manufacturers for the use of their customers are more misleading than otherwise. One point which should not be overlooked in judging carbolic powders is that the phenols must be in an uncombined state; for this reason all "powders" having for their base lime or other alkaline earth, are comparatively valueness as disinfectants.

Perhaps the most reliable process for the estimation of phenols when uncombined in carbolic powder is that described by Dr. Muter, in which 100 grams of the powder are taken and agitated with 400 c.c. of methylated spirit; 300 c.c. of this spirit (equal to 75 grams of the powder) are now added to 200 c.c. of 5 per cent. solution of sodium hydrate, and the mixture evaporated to about half its volume, when any tar oils or naphthalin

present will separate out, and must be removed by filtration. The filtrate is now evaporated to 50 c.c., and this washed out of the basin into a special form of measuring tube, and made up to a volume of 60 c.c.; 25 c.c. of concentrated hydrochloric acid are now added, with constant stirring, followed by a few c.c. of sodium chloride. The phenols will now be disengaged and rise to the surface, and their volume read off at 60° Fahr., this giving the amount of commercial carbolic acid in 75 grams. The process has to be somewhat modified when the powder to be examined has a lime base, as the phenols are then combined. In that case, before treating with alcohol, small quantities of dilute sulphuric acid are added, until the powder has a distinct though faint acid reaction (care being taken that none of the powder escapes the action of the acid), when the process is applied as above described.

Soxhlet was the first to suggest that the addition of minute quantities of phenolphthalein to margarine and mixtures of butter and margarine should be made compulsory, in order to afford a ready means of proving whether a sample of butter was genuine or not, for on touching a sample so treated with an alkali the characteristic red-violet colour is immediately developed. Objection was taken to his proposal on the ground that the keeping qualities of the margarine were, in consequence, considerably impaired. Hart has recently carried out some investigations to elucidate this, and has shown that when phenolphthalein is added to margarine in proportions of 2 to 6 milligrammes to 50 grams of margarine, no deterioration took place after six weeks' exposure to light and air. With a view of finding out whether it had any toxic effect he took doses of from 1 to 20 milligrammes without ill effect, but on increasing the dose to 0·3 gramme he suffered from diarrhœa, which became more severe when the quantity waa increased to 0.5 gramme. When taken in such quantities as these the margarine had a distinct bitter taste. He strongly approved of Soxhlet's proposal, as no ill effects were produced by such small quantities as were needful for this purpose.

Small-Pox in France.—A short statement has been made by M. Hervieux in the "Acad. de Méd." on the epidemic of small-pox during 1892 and 1893. It appeared chiefly in and around Paris, but with subsidiary outbreaks in the provinces. During the first six months of 1892 14 deaths were reported in Paris; in the last six months 26 deaths. In the first six months of 1893 63 deaths were reported, and in the second six months 184. The outbreak is attributed to the absence of revaccination, and the presence of small-pox in England, this being supported by the heavy mortality in the Pas de Calais and neighbouring departments.—*Sem. Méd.*

ON AN OUTBREAK OF SMALL-POX IN AN ISOLATION HOSPITAL,

Apparently Caused by Infected Steam from a Laundry.*

By Geo. Wilson, M.A., M.D., M.O.H. for the Mid-Warwickshire Combined Sanitary District.

It has been my duty, in conjunction with Dr. Bernays, medical officer, to inquire into four cases of small-pox, all of which had contracted the disease in the infectious hospital for Solihull while convalescing from scarlatina. The facts are these: Two of the patients, aged respectively 14 years and 25, were discharged cured, the one on January 23rd and the other on the 25th, and were re-admitted suffering from small-pox of a mild type, the one on January 30th and the other on February 3rd, with the rash well-developed. It was ascertained that this second case fell ill on January 31st. The other two cases, aged respectively 24 and 12 years, sickened with small-pox on January 28th and 29th respectively.

In the beginning of January there were no small-pox cases in hospital, but on the 10th a man aged 20 years was admitted suffering from malignant small-pox, and died on January 18th. Two other cases were admitted on January 15th; on the 21st another severe confluent case, and on January 29th and 31st two more cases were admitted. Thus apart from the cases which contracted the disease in hospital there were six others under treatment in the new block at the close of the month.

It was ascertained that the first patient with a malignant attack had never been vaccinated, and certainly showed no vaccination marks. The smell from this patient was so very intense and offensive that the windows of the ward had always to be kept open.

Now the cases which contracted the disease in hospital sickened on January 28th, 29th, or 30th. The washerwoman attached to the hospital also sickened with small-pox on the 29th. This woman was revaccinated last year, but unsuccessfully.

The whole of these five cases falling ill between January 28th and 30th proves that the infecting agency was common to all, and presumably took effect on the same day and between the 17th and 18th. As the case which proved fatal on the 18th was admitted on January 10th and buried on the 20th, any infection which might be conveyed from the dead body is excluded as a common agent on account of the time allowed for incubation being too short. Apart from the possibility of aërial connection—that is, transmission of infection through the air from the new block direct, the frequency of which is strongly maintained by the

* From a report to the Solihull Rural Sanitary Authority.

medical department of the Local Government Board—we ascertained that the first washing from the small-pox block, including the bed sheets and linen of the malignant case, was done on the 17th. Distinct rules were laid down by the medical officer as to the steeping of these articles in a strong disinfectant solution before being taken to the washhouse, and separate days were also assigned to the washing of linen from the scarlatina block and the new block in which the small-pox cases were treated. It was succinctly stated to us that the scarlatina washing was done on January 15th, the clothing then washed not having been distributed to the patients for wear till the 21st. If this statement is correct it excludes the probability of infection being conveyed directly by mixing articles of clothing or bedding from the two blocks in the washhouse. The fact, however, that the washerwoman contracted the disease on or about the 17th, when the small-pox linen was first washed, and that this date corresponds approximately to the incubation period of the other cases, affords a strong presumption in our minds that the disinfection of the clothing from the small-pox cases was insufficient, and that when the articles were put into the copper the steam developed before the boiling point was reached, and wafted with it the infective germs of the disease. The washhouse is situated about 30 feet from the scarlatina block in which the patients contracted the disease, while the distance from this block to the new (small-pox) block is about 90 feet. Although, therefore, it is possible that the infection of the disease may have been conveyed direct from one block to the other, we are inclined to accept the view that the infection was conveyed in the vapour given off by the copper in the washhouse, which lies midway between the two blocks, though not in a direct line. It was ascertained, too, that the prevailing winds were from the direction of the new block and washhouse during the whole of the middle and latter end of January. Further, the washerwoman complained at the time of the very offensive smell given off by the sheets and linen received from the small-pox block.

We inquired carefully into all other causes, such as personal intercourse and interchange of closet pails and coal boxes, but though we are not prepared to say that the rules and instructions have been carried out as strictly as could be desired, we do not believe that the cause of the outbreak lies in any of these directions.

It must be remembered that the resources of the hospital have of late been seriously strained, and that the extensions and alterations have from time to time been interrupted and are not yet completed. We believe that if the disinfecting apparatus had been ready for use this outbreak would not in all probability have occurred. The hospital has done excellent service during the last seventeen years, and though we have repeatedly had small-pox under treatment in the small separate block forming part of the old hospital buildings during these years, and three times last year, we have hitherto escaped any such accident as has now occurred.

The nursing staff has all along been adequately provided, and we now say that the nursing in the different blocks is entirely separate, and that there has all along been complete separation of patients suffering from different diseases.

Dr. WILCON, in forwarding the preceding report, remarks that his conclusions as to the probable cause of the outbreak are based not only on the facts as stated, but he has a vivid recollection of an outbreak of small-pox in a small town a good many years ago, in which cases were traced to the burning of the bedding and clothing of a fatal case in a small garden in a somewhat crowded locality. The fatal case was the first cause of the outbreak. No other cases cropped up until within eleven to fourteen days after the burning of the bedding and clothing, and these were in the near neighbourhood of the infected house. Instructions had been given to pour paraffin over the clothing and bedding before burning, but on subsequent inquiry there were grave doubts whether these had been complied with. Instructions were also given to envelope the dead body in a sheet wrung out of a strong solution of carbolic acid, and also to throw in a large quantity of chloride of lime into the coffin before nailing the lid down. There was great reason to fear that these instructions had also been neglected, because after the incubation interval several cases cropped up in the streets through which the dead body had been conveyed in a hearse, and apart from the fatal case they were all of them first cases. He was so impressed with the lessons of this outbreak that he has never since ordered the bedding or clothing of small-pox cases to be burned, but where there is no hospital accommodation or proper disinfecting apparatus, always to be burned with proper precautions, while the greatest care should be taken in the disinfection of dead bodies by enveloping them completely in a sheet wrung out of perchloride of mercury solution, and if possible enclosing them in an air-tight metallic shell. He further believes that while there can be no doubt of aërial connection as a cause of the prevalence of small-pox in the neighbourhood of isolation hospitals, he is of opinion that inasmuch as many severe cases of the disease are not removed until they are in a highly infectious stage, the aërial connection is more likely to originate from the ambulance as it passes through crowded thoroughfares than at long distances from the hospital; and the same remarks would apply to the trail of a hearse conveying a dead body which had not been properly disinfected or hermetically sealed up. Then, too, it is well known that the ambulance, if it presents an appearance different from an ordinary vehicle, is always more or less an object of curiosity *en route*; it may be brought to a stand-still where there is a block in the traffic, and it is always a difficult matter to keep prying neighbours at a safe distance when a patient is about to be removed. In localities where disinfecting stations have been provided there are the further risks attending the removal of highly infected bedding and clothing to be disinfected. He ventures to suggest that all these are factors which contribute far more largely to the theory of aërial connection than the mere aggregation of small-pox cases in an isolation hospital situated in a populous neighbourhood. At the same time he admits that the limited outbreak in the Solihull district fully confirms the policy of the Local Government Board in discountenancing the reception and treatment of small-pox patients on the same site and under the same administrative arrangements as other cases of infectious disease. But in comparatively small districts provided with isolation hospitals, outbreaks of small-pox are so rare that the risks are faced, and, as a rule, without accident.

SUMMARY OF PROF. J. B. HAYCRAFT'S MILROY LECTURES ON "DARWINISM AND RACE PROGRESS."

Dr. J. B. Haycraft, in his Milroy Lectures on "Darwinism and Race Progress," shows how racial change may be produced (*a*) by those who are most suited to their surroundings having a better chance in the struggle for life than those less suited; and (*b*) by the effect of the environment upon the germinal cells in cases where constitutional blood alterations are produced in the body of the parent. Pathogenic micro-organisms are amongst the most important environmental agencies which are capable of setting up constitutional change. The mechanism of the immunity following these diseases is in dispute; but it seems clear that after a specific fever the individual is unaffected except as a race producer, inasmuch as the children are less liable to attacks of the same disease. Small-pox and measles are well-known instances of this, as are also malaria and yellow fever. Thus Dr. J. S. Billings states that the deaths from malaria among the black population in Sierra Leone are only 0·24 per cent., while among the recent white settlers they are 47 per cent. Dr. Haycraft believes, therefore, that if in the next hundred years we altogether banish this group of microbes from Europe, a racial deterioration will result. "During an attack, *e.g.* of measles, although life and death may depend chiefly on the power of the phagocytes to resist and destroy the microbes, any concomitant weakness may decide the case, so that these diseases, to a certain extent, are race improvers, inasmuch as they prevent a larger number of weak than of strong children from growing to maturity and contributing to the production of the next generation." In the case of the microbes of leprosy and syphilis, profound and lasting effect upon many of the tissues of the body is added to the blood changes. In leprosy the germ cells are not reached, as the disease is not transmitted from parent to child. "Hideous as are the aspects of leprosy, it must be looked upon as a friend of humanity, for while the microbe of typhoid will attack a man who is healthy . . . that of leprosy feeds upon those who are debilitated from conditions under which healthy and strong racial development is impossible." The microbe of syphilis, unlike that of leprosy, but like that of measles, feeds on healthy blood and tissue. It attacks the strong as well as the weak, and if the weak more readily succumb, the strong and vigorous are more apt to acquire it. It is not, therefore, selective, like leprosy, and its capacity of transmission ranks it as a disease distinctly inimical to race progress.

The tubercle bacillus, like the bacillus of leprosy, is a friend of the race, for it attacks only the feeble. The phthisical type is easily recognisable; and members of it are very prone to non-tubercular pulmonary and other affections. Moreover, owing to their attractive personal appearance, they easily marry, and they are very fertile. It is probable, therefore, that notwithstanding their tendency to early death, they contribute almost their proportional quota to the increase of the population. Were the tubercle bacillus exterminated, they would contribute more than their share; and had Koch's "tuberculin" proved a successful cure for phthisis, "it would be terrible to contemplate the eventual suffering that would have resulted from the constantly increasing numbers of the phthisical type that would have been born with each generation." The tubercle bacillus attacks not only the ill-fed and ill-conditioned, but also those who live well. Those who live in well ventilated rooms, and who conform to every sanitary regulation, may still belong to the type who fall a prey to it. It is certain, therefore, that, improve the external conditions of life how you will, this type will remain.

The infective diseases as a whole then being our race-friends, it is evident that "as selection is the race changer, we must replace selection by the microbe by the selection of human forethought." The artificial preservation of the weaker type causes it to increase relatively to the stronger. It is by the process of natural selection that the lower types have given place to the higher, and man's intelligence has grown from brutish instinct. Good can prevail only by the elimination of the bad.

Dr. Haycraft then applies these general conclusions to the cases of insanity and alcoholism. He sums up that were no question of inheritance involved, prohibition of the sale of alcohol would remove a selective agency, and in this respect be harmful. On the other hand, where there are facilities for marriage, such prohibition would prevent a certain amount of transmitted debility which would follow were habits of drunkenness permitted, and in this respect its introduction would be beneficial. More good is, however, to be expected from measures directed towards preventing habitual drunkards from producing offspring than from prevention of the sale of alcohol.

Dr. Haycraft guards himself against the supposition that his conclusions would justify scattering broadcast the microbes of cholera and small-pox, or in leaving unlimited whiskey in the way of the drunkard. He points out in answer to the contention that the health of the race is being improved, as shown by the increased expectation of life, that this does not necessarily employ increased innate healthiness, but may mean increased amelioration of surroundings alone. Freedom from disease does not imply robustness of constitution. There is no reason to suppose that the English race is more robust than it was fifty years ago. Infantile mortality, zymotic and tubercular diseases have declined. There has, however, been an increase in circulatory, respiratory, and consti-

tutional diseases. "Deaths from old age are less and less frequent, indicating that we are permeated by less healthy constitutional strains." "I do not see how we can shirk the fact that preventive medicine and civilisation between them have already deteriorated in a marked degree the healthy vigour of our race. . . . Preventive medicine is trying a unique experiment, and the effect is already discernible—race-decay." But why should the microbe select? It is not to be desired that preventive medicine should cease making war upon the microbe, provided at the same time other selective agencies are used to replace them. We must bring about such strong public opinion as will force people to look upon the act of giving birth to a diseased child as one of the most cruel sins.

In applying his conclusions to the question of crime and incapacity, Dr. Haycraft preaches the gospel of segregation and prevention of reproduction of the criminal and incapable classes. In the absence of this refusal to allow the unfit to reproduce their kind, physical deterioration is in progress in all classes. Once people have learnt to look ahead, their attitude in respect to marriage will be altered; the sickly will with difficulty find mates, and an improvement in the well-being of the race may be expected.

LAW REPORTS.

The Distinction between a "Drain" and a "Sewer."

The case of "Travis v. Uttley," heard in the Queen's Bench Division of the High Court of Justice on November 27th and December 4th last, decides a question of great importance to all local authorities under the Public Health Act, 1875.

Section 4 of that Act defines the term "drain" as meaning "any drain of and used for the drainage of one building only, or premises within the same curtilage, and made merely for the purpose of communicating therefrom with a cesspool or other like receptacle for drainage, or with a sewer into which the drainage of two or more buildings or premises occupied by different persons is conveyed."

The same section defines the term "sewer" as including "sewers and drains of every description, except drains to which the word 'drain' interpreted as aforesaid applies, and except drains vested in, or under the control of, any authority having the management of roads, and not being a local authority under this Act."

The 13th section of the Act provides that all existing and future sewers within the district of a local authority (with certain exceptions not material for the purposes of the present case) shall vest in and be under the control of such local authority, and section 15 requires the local authority to keep in repair all sewers belonging to them, and the 19th section requires the local authority to cause the sewers belonging to them to be kept so as not to be a nuisance or injurious to health.

In the case of drains, on the other hand, the liability to maintain and repair rests upon the owner, and the question of whether certain descriptions of what are popularly known as drains are, for the purposes of the Public Health Act, "drains" or "sewers" becomes one of serious practical importance to local authorities and to owners of property.

In the present case the drain, the subject of the proceedings, ran through the basements of three adjoining houses and received the drainage of each of such houses, and transmitted it into an adjoining sewer. The plans for the erection of the houses had been deposited with the local authority in 1868. The drain recently became leaky, and sewage from it soaked into the cellars of two of the houses, and the owner was thereupon summoned by the sanitary inspector of the district for an offence under the Public Health Act, 1875, on the ground that the premises were in such a state as to be a nuisance or injurious to health.

The owner, on the hearing of the summons, contended that the drain was a "sewer" within section 4 of the Public Health Act, and therefore vested in the local authority, whose duty it was to repair it and remove the nuisance under the provisions of the Act above quoted. The justices acceded to this contention and dismissed the summons, but consented to state a case for the opinion of the High Court upon the legal question involved.

On the case being heard in the Queen's Bench Division, counsel for the appellant (the sanitary inspector) argued that the drain was part of the respondent's land, and that it was incredible that the legislature could have intended to vest it in the local authority as a sewer; while counsel for the owner contended that as the drain received the drainage of more than one building it was a sewer within section 4 of the Public Health Act.

The courts held that the drain was a sewer within the meaning of the Act, and was therefore repairable by the local authority.

Mr. Justice Wright, in the course of his judgment, stated that to hold what was really a private drain vested as a sewer in a local authority was to hold that a local authority could take away part of a man's land in order to perform its functions, and also was liable for the cost of keeping private property in repair—two apparent absurdities—but that the language of the section was plain, and that the result might have been intended in order to avoid the difficulty of dealing with the complex effects of the right of several houses to use the same drain.

The case is also reported in 63 Law Journal Reports, Magistrates' Cases, p. 48; 96 Law Times, p. 159; Law Reports (1894) 1 Queen's Bench, p. 235; and 57 Justice of the Peace, p. 787.

What is a Sewer made for Private Profit?

The case of "Ferrand v. The Hallas Land and Building Company," heard in the Court of Appeal on May 12th and 16th last, raises a further question upon the sections of the Public Health Act dealing with the ownership of and responsibility for drains and sewers.

In this case the plaintiff was the owner of land situate on both sides of a stream called "Cullingworth Beck," and the defendants were the owners of land near to the stream, but situate above the plaintiff's land. The defendants had erected on their land a row of sixty-nine cottages, and had constructed a drain from each cottage, and a long intercepting drain, or sewer, with which each of the cottage drains was connected. The intercepting sewer communicated with the Cullingworth Beck, and the sewage from the cottages was thus conveyed into the stream, and caused pollution of the water. The defendants before constructing the sewer had submitted plans of the drainage to the local authority, and these had been approved by them.

The plaintiff sued the defendant company to recover damages for the discharge by them of sewage into the stream, and also asked for an injunction to restrain the defendants from continuing to discharge sewage into the stream; and at the trial of the action Mr. Justice Bruce granted the injunction asked for.

From this decision the defendant company appealed, and on the hearing of the appeal counsel for the appellants argued that the appellants were not responsible for the long drain or intercepting sewer; that it had been constructed by the defendants with the sanction of the local authority, and that the defendants were exempt from liability, under section 3 of the Rivers Pollution Prevention Act, 1876. Further, that the drain in question was a sewer within the meaning of the Public Health Act, 1875, and that it was therefore vested in the local authority, and the defendants had no control over it. Counsel for the plaintiffs (the respondents in the appeal) contended that the long drain was not a sewer, and that it did not vest in the local authority, on the ground that it was a sewer made for private profit, and therefore came within the exception of section 13 of the Public Health Act. For the appellant it was urged that the sewer was not made for private profit within the meaning of section 13, although it might increase the value of the houses which it was made to drain.

The court held that the long drain was a sewer within the meaning of the Public Health Act, 1875, and that it was not a sewer made for private profit, and was therefore vested in and under the control of the local authority, and that the defendants had no control over the sewer, and were not responsible for the pollution of the stream.

The Court, therefore, allowed the appeal.

The case is also reported in 62 Law Journal Reports, Queen's Bench, p. 749; 57 Justice of the Peace, p. 692; 69 Law Times Reports (N.S.), p. 8; and Law Reports (1893), 2 Q.B., p. 135.

A Further Decision on the Question of Sewers made for Private Profit.

The case of "The Local Board of Minehead v. Luttrell," heard in the Chancery Division of the High Court of Justice on February 24th last, is another decision on this important question.

The facts stated show that prior to the year 1878 the town of Minehead, in Somerset, had no system of sewerage, and that in that year the defendant, who was the owner of the greater part of the town, at his own expense constructed a system of sewerage for effectually draining it. The sewers were chiefly laid under the public highways, and in return for his outlay the defendant demanded a sewerage rate from all those whose drains were connected with his sewers, whether they were his tenants or not. All the expenses of maintaining the sewers and flushing them were borne by the defendant. The cost of construction of the sewers amounted to about £5,000.

In 1891 the plaintiffs were constituted the urban sanitary authority for the district, and they claimed that by virtue of section 13 of the Public Health Act, 1875, the sewers constructed by the defendant were vested in them, and asked for a declaration to that effect.

The defendant contended that the sewers were constructed by him for his own profit, and came within the exception in section 13 of the Act.

The Court held that the defendant had constructed the sewers not merely for the purpose of draining his property, but had laid out his money for a speculation, intending to be compensated for his expenditure by taking a payment from everybody who used his sewers, whether his tenants or not, and that it was therefore a case in which the defendant had laid the sewers for his own profit within the meaning of the exception in section 13 of the Public Health Act, 1875, and that consequently the action failed.

The case is also reported in 96 Law Times, p. 412; and Weekly Notes, March 10th, 1894.

Pasteur Institute of Buda-Pesth.—During the three years of its existence 1,350 persons have been treated at this institute, with a mortality of 0·91 per cent. In the third year 647 cases were treated, of whom 12 developed the symptoms of hydrophobia, notwithstanding the treatment. Of these 12, however, six were only treated after some delay, and may rightly be deducted from the statistics. With this deduction there was a mortality of 0·93 per cent.—*Rev. Sci.*

ANNUAL REPORTS OF MEDICAL OFFICERS OF HEALTH.

Before we have had time to complete our survey of the annual reports for 1892, those for 1893 are pouring in upon us. It is impossible in the space at our disposal to notice more than a small portion of these. Some of the best reports must needs go unnoticed, as they contain only matter of local interest, and therefore do not lend themselves to extracts. Where, however, points of general interest in practice or experience are stated in annual reports, an attempt will be made to place them on record in the columns of Public Health.

Crewe.

Mr. Herbert Jones, D.P.H., in his annual report for 1893, recommends the inclusion of phthisis in the schedule of notifiable diseases, when the Infectious Disease (Notification) Act is adopted. Crewe has as yet no isolation hospital, except for small-pox cases, a condition of things urgently calling for reform. It appears also that the privy and ashpit system is still in vogue in the borough, the average annual cost for emptying these being about 1s. 4¾d. per head of the population.

The Diphtheritic Virus.—The diphtheritic poison is exceedingly tenacious of life. In two instances a fatal case of diphtheria occurred in the immediate neighbourhood of one that had proved fatal some months previously, and I found that the cesspools, which had been emptied about the time of the occurrence of the first two, had not been again emptied until just before the second two patients were attacked; the poison having thus probably been unearthed and disseminated.

Brighouse.

Dr. Meredith Young draws attention to the desirability of postponing an attack of scarlet fever to as late an age as possible.

Children from one to five years of age are more susceptible to the poison of scarlet fever every year of their age from one to five years; after that age not only does the susceptibility decrease every year, but the risk of a fatal attack diminishes. Hence for every year after the age of five that a child escapes scarlet fever, there is something saved—a doctor's bill or a child's life. The opposite idea is the one I have found to be prevalent, viz., the fatalistic notion that "if a child is to have it, the sooner he has it and gets over it the better."

Factory Occupation and Premature Births.—There has been a great deal of discussion lately on the question of employment of married women in factories and workshops. The Factory and Workshop Act of 1891 (s. 17) says:—

An occupier of a factory or workshop shall not knowingly allow a woman to be employed therein within four weeks after she has given birth to a child.

This is a very short period indeed, and in fact takes more thought for the mother than the child, if, indeed, it was ever intended to provide for the child. One thing which cannot be remedied by anything but the conscientiousness of the parents is to take account of the fact that an arduous occupation is often the cause of premature birth: did married women take this into consideration and act on it by discontinuing the hardest work for a short time (say two months at least) before the anticipated birth of the child, many deaths from premature birth might be prevented.

Coventry.

Dr. Fenton draws attention to the danger of chemists undertaking the treatment of what may appear to them slight cases of illness, but which in two cases quoted by him were small-pox. The result was that an outbreak of small-pox in Coventry did not come to light for a fortnight, and nine persons were infected, of whom three were heads of families and important workmen earning good wages. Might not these chemists have been prosecuted under the Apothecaries Act?

THE HORNSEY LOCAL BOARD AND THEIR TECHNICAL ADVISERS.

At a recent meeting of the Hornsey Local Board the annual report of Dr. Clothier, the able medical officer of health for the district, was received and considered.

Among the paragraphs in the report was the following:—

Each house should be protected from sewer gas by a proper intercepting trap, and its own inlet and outlet ventilators used to ventilate the drains of the house only, and not to assist in ventilating the sewer also, which would bring the sewer gases into unnecessarily close and dangerous proximity to the dwelling. In my opinion no dwelling can be considered secure unless the sewer gases are completely severed from its drainage system.

Further on in the report is a long list of houses in which the occurrence of typhoid fever or diphtheria coincided with the absence of intercepting traps among other defects.

After considerable discussion it was decided to send back the medical officer's report, with a view apparently to the omission of the allusions to intercepting traps. We trust that Dr. Clothier will return the report in its present form. As it now stands it frees him from all responsibility for any evil consequences which may be caused by ventilating the main sewers into the house-drains, and possibly into the houses. It is quite within the option of the Hornsey Local Board to decline to act upon the definitely expressed opinion of their health adviser in favour of intercepting traps. By so doing, however, they incur a very serious responsibility, and one which on reflection we hope they will decline in the interests of the suburb whose health they are appointed to guard. The point for them to determine is whether they will act upon the advice of their technical advisers, backed up as it is by an overwhelming weight of skilled opinion; or will yield to the ignorant and selfish pleading of builders and others whose pockets may be somewhat depleted by the necessary reform.

Next month we shall print extracts from a report to the Hornsey Local Board, dated July, 1893, by Mr. De Courcy Meade, M.Inst.C.E.,

Engineer to the Board, in which he gives the strongest reasons in favour of the provision of such intercepting traps.

This fact still further increases the grave responsibility of the Hornsey Local Board in disregarding the advice of their two chief skilled advisers.

OBITUARY.

Mr. David Davies.

We regret to have to record the death of Mr. David Davies, formerly medical officer of health for Bristol, which took place at Aberceri, Newcastle Emlyn, Carmarthenshire, on March 9th last. The deceased was a student at St. Thomas's Hospital, where he distinguished himself by taking several prizes and the Cheselden medal, and obtained his qualifications of M.R.C.S. and L.S.A. in 1845. Subsequently he became house-surgeon at the Loughborough Infirmary, an appointment which he gave up, after three years, to settle in Bristol. In 1849 the Bristol Guardians asked him to become a cholera officer during the then epidemic, and the ability, energy, and success with which he carried out his duties in that capacity were fully recognised. About fifteen years after, in 1865, he was appointed "medical inspector" to the Bristol Local Board of Health, and in the following year medical officer of health for the city, an appointment he held for twenty-one years, until his retirement in 1886. Mr. Davies, therefore, saw practically the beginning of sanitary reform in Bristol, and was one of the chief agents in urging on and perfecting the work begun. It was especially in this early work that he had to combine the tact of a skilled diplomatist with the practical knowledge of an advanced sanitarian in order to overcome the *vis inertiæ* of evil habits and vested interest. So many-sided were his methods, so varied his plans of attack, and so full of interest were his conflicts with disease, that the story of his twenty-one years work in Bristol might almost be regarded as a "romance of sanitation." As indicating the conditions to be dealt with by original medical officers in large towns, it may be interesting to state that in 1850, out of 649 streets and lanes in Bristol, nearly one-half, and out of 688 courts more than one-third were never scavenged or cleansed; the sewers were old, partially distributed, and inefficient; water was scarce, and mostly drawn from polluted wells; overcrowding was very common in many parts; typhus fever was endemic; and the death-rate was 28 per 1,000. In Mr. Davies' own words, "When I went my first round, on the 3rd of February, 1865, I frequently found three fever patients in one bed. In one instance, in a court in Bread-street, I found seven typhus patients on the floor. The water drunk in many houses was only diluted sewage; there was no hospital which could receive the patients; the houses were dirty in the extreme; the mass of people were in that state of apathetic resignation which is observed in great epidemics. It was truly depressing, and the situation was one which would almost have made Mark Tapley 'jolly.'" Yet in six months typhus was stamped out, and has since been only an occasional visitant. From that time onward the sanitary history of the city was one of progressive improvement. The basis of the whole of the working of the medical health department in Bristol owed its origin to Mr. Davies' great organising ability and experience: and he had a special gift of imparting knowledge and enthusiasm for work to those working with or under him. On his retirement in 1886, his unwearied devotion and great skill were testified to by many members of the Town Council, which body passed a resolution placing on record the high appreciation of the way in which he had performed his duties, and a presentation was made to him by magistrates, members of the Council, and those officially connected with him. The deceased was a most competent and zealous officer, taking high rank among the medical officers of the county, and his opinion on infectious disease was especially valued. He was a great friend of the late Dr. W. Budd, who was one of the earliest exponents of the germ theory of disease, and who has put on record his high estimate of Mr. Davies as a medical officer, in a report which he published on the cholera in Bristol in 1866, showing what measures had been taken to prevent its spread. The result of the steps taken was most satisfactory (only twenty-nine deaths occurring, though the infection was constantly introduced at fresh points), and the measures adopted were recognised by the leading medical men of the day as most effectual. In addition to the medical officership of Bristol, Mr. Davies held a similar position under the Stapleton Local Board and the Barton Regis Rural Sanitary Authority. He was at one time president of the Bath and Bristol branch of the British Medical Association; he was also lecturer on hygiene at the Bristol Medical School, was formerly an honorary surgeon to St. Peter's Hospital, Bristol, consulting surgeon to the Bristol Dispensary, and was greatly interested in the "Formidable" training ship, being for some time its honorary surgeon. A Welshman by birth, the Bristol Cambrian Society found in him a warm supporter and one time president, and his love for Wales never lessened. After his retirement thither he was appointed a magistrate for the county of Cardigan. Unsparing of himself in the discharge of his duty, and displaying unbending determination with great fertility of resource in attaining his points, he was yet amiable, genial, courteous, and kind-hearted. He was undoubtedly the right man in the right place, and the work he did has not only influenced for good the health of his own city, but has also left its mark on the general sanitary advancement of the country.

THE GROWTH OF OPINION ON THE SELF-PURIFICATION OF RIVERS.

By Wm. Naylor, F.C.S., A.M.I.C.E., Chief Inspector Ribble Joint Committee.

(*Concluded from page* 193.)

He then gave particulars of a number of samples drawn, and in spite of the entrance of the sewage of Munich, makes the remark, "Neither on the surface of the water by the shore, nor in the sediment on the bottom, was there anything found which could have pointed to a noxious pollution of the Isar or to masses of fæces, and thus it can be safely concluded that the whole river will be found as free from it. If the Isar water drawn on March 7th at Ismanning had been submitted in a clarified state under the name of well or spring water to a Government Inspector of Food and Drink, and if he had been asked if it might be used for domestic supply the answer would have been an unqualified 'yes.'"

Following this in the same year, 1890, Professors A. Celli and A. Scala contributed to the "Transactions of the Royal Medical Academy of Rome," 16th year, vol. V., series 2, a paper on "The Water of the Tiber: A Study from the Hygienic Point of View."

Concerning natural depuration these authors state: "When we examine the determinations of organic material and the bacteriological analyses executed on water taken at Ponte Molle, we are surprised by its purity in spite of the filth emitted into the Nera and the Aniene, and we are still more surprised when we notice that the Tiber in passing through the city, although it received the foul materials in such large quantities, is polluted to a limited degree at the left shore and to a very limited degree in the middle of the river. Auto-depuration cannot be accepted as the explanation, because the polluted waters have in this part of their track such a very short course as to exclude the possibility of oxidation; in the suburban part of its course, near San Paolo, the quantities of carbon or organic nitrogen, in the middle of the current, are but little inferior to those found on the left bank of the river at various distances from the Cloaca Maxima. We ought to believe, therefore, rather in a dilution than in an auto-depuration, especially when reckoning that 60,000 kilogrammes of organic materials reach the river in twenty-four hours, or 0·69 in a second, which the volume of the river (180 cubic metres per second) dilutes till there are only 0·31 kilogrammes for every cubic metre, and ·0003 grammes for every litre, or a quantity which cannot alter that representing the organic material existing in the water itself. But the dilution cannot happen instantaneously in the whole mass of the water, and therefore certain zones remain polluted which are revealed by the analyses.

"From San Paolo, where the cloacal waters seem to be insufficiently diluted, to Finmicino, the organic matter and the products of decomposition diminish continuously, so that at the Maglian the water has already been appreciably improved, and at Finmicino is as pure as at Pont Molle.

"We must believe, therefore, with those who have studied the waters of rivers, in an auto-depurative property, by which the organic matter is subjected, in free watercourses, to rapid destruction and oxidation.

"The Tiber affords a very good example, not only because arriving at Rome after so great a pollution it appears pure, but because in the short transit from Rome to Finmicino it is able to oxidise completely the whole of the refuse of the city."

These authors, after proving the English Commissioners wrong, and quoting the analysis of Hulwa, Fleck, Konig, Frank, Muller, Meich, and others, conclude that there is no doubt of the existence of two concomitant biological actions in the extension of the self-purification of rivers, and that it could not be denied that the most important part belonged to micro-organisms, since they by decomposing the proteid substances prepare for the successive chemical actions. In other words, they claimed that the known process of nitrification proved by Celli and Marino in 1886, and a little later by Haraeus, and afterwards by many others, was brought about not by a single special bacterium, but by several bacteria, probably all the saprophytic bacteria in the water.

They point out that the water of the Tiber, like that of the Isar and the Spree, undergoes a natural purification, not only of the organic substances but also of the bacteria. They do not agree with Frank that this is due to deposition, as the Tiber is nearly always, even in dry weather, more or less turbid owing to matters in suspension. The cause of the phenomenon—decrease in bacteria—is, in their opinion, due to the death of the nitrifying organisms when they have finished their work of purification in the water.

In a similar way, they point out, other agents of fermentation die when they have completed their special work. Sometimes this happens in consequence of the production of matter by their work, in certain quantities poisonous to them. Among these ultimate products in the nitrifying process carbonic acid is given off, which remains dissolved in the water and is poisonous to aquatic bacteria.

This paper was followed by one contributed to the Annales of the Institute of the Royal University of Rome, 1891, by Professor Serafini.

Professor Serafini opens with the statement: "By means of a long series of operations, a fact has now been scientifically demonstrated, which common observation had previously asserted, that is to say, that in the greater number of cases the water of rivers becomes purified

spontaneously, and in a short time from all the refuse it receives while passing through a centre of habitation."

This paper is a report of experiments carried out to determine the effect of aëration upon water.

The author claimed that previous researches under this head were either solely chemical and did not, therefore, take into account the presence of bacteria, which are now beyond question the cause of nitrification, or they took these alone into account, or were conducted in a way to which a strong objection could be taken.

He refers first to the work of Shelhass, Tidy, Hartley, Kilahan, Hulwa, Rosenburg, Moser, Frank, Prauznitz, Celli, and Scala. All these, says Serafini, and others of less importance have more or less completely proved that the amount of organic matter, of ammonia, and of bacteria in the waters diminish relatively at a short distance from the point of pollution, while those products which are indicative of oxidation such as nitrous acid, and finally nitric acid increase. "It is very true," continues he, "that against this spontaneous purification may be cited some observations which attribute it to special local conditions, and especially to the relation between the quantity of the polluting substance, and the volume and velocity of the water in the river. Nevertheless, the mass of experiments performed by engineers, chemists, bacteriologists and hygienists, put beyond doubt and above all objection the self-purification of rivers. That which is most studied and discussed, and concerning which opinions are most varied, is the particular process by which such purification takes place.

"In the face of so many opinions I wished also to study experimentally so important a question, hoping to make a modest contribution to its solution, particularly the manner in which the purification of a continually aërated water is brought about as compared with the water simply exposed to the air in a manner similar to stagnant water.

"It is now beyond question that bacteria are the principal factors of nitrification, and that to them is due the greater part of the process of purification. The experiments of the English Commission on this point, to which investigators owe so much, included an experiment with an infusion of air, on the assumption that the motion in the movement of the bottle would be the cause of oxidation. But the experiment failed owing to the fact that there was not a continual renewal of air as really happens in rivers, besides which, the determinations were limited to the organic substances in the water, without taking into account either the behaviour of the ammonia and nitric acid, or, what was impossible at that time, the bacteria. Similarly, the researches made by Hartley on the Carawaystick, are on the one hand too much limited in space and time, and on the other not impartial, as he limited himself to proving that the chemical composition of the water before and after the cascade was not altered, although in its fall the water became mixed with an enormous quantity of air. The aëration took place in the cascades in too brief a space of time and flow, and too short a distance, to have any sensible effect upon the composition of the water. The researches of Hartley, too, by reason of the period at which they were undertaken, give no data regarding micro-organisms."

Concerning the experiments of Emich, Serafini claims that while he has studied the effects of oxidation which the micro-organisms in the presence or absence of aëration produce upon organic matter dissolved in water, he has not occupied himself with the question as to whether in a polluted water containing micro-organisms all the processes of purification proceed differently when a continuous aëration intervenes or otherwise, similar to what goes on in the normal course of rivers.

Concerning the researches of Alessi which I have already alluded to, Serafini stated: "However important these experiments of Alessi may be, they do not completely prove the influence and the participation of air by itself in the processes of the oxidation of proteid substances in water. They only confirm in another way the opinion that the nitrification is due to the bacteria, and also that which Schloesing and Muntz affirmed too in 1878, and what Zodor has also proved by his own experiments, namely, that without the presence of air the oxidation of the organic nitrogen into nitric acid cannot take place, and that instead of this there supervenes in such cases a putrid fermentation, granted the presence of anærobic and active micro-organisms. In the first group of experiments he got rid of the oxygen from the water and closed the bottles, and in such a way he caused, if not the death, at least the arrestation of the vital activity of the bacteria. In the second experiment he shut into his vessels, together with the water, a certain quantity of air, when the oxygen, as clearly shown in the experiments of the English Commission, disappeared little by little, consumed by the micro-organisms, whence these in consequence either die or cease to be active."

Serafini then describes his own experiments, in which he took some flasks, three litres capacity, carefully washed with sulphuric acid and distilled water free from organic matter, and then placed to sterilise for three hours in a dry atmosphere at a temperature of 160°. Into these decanters he put the water for examination, filled them to two-thirds of their capacity, and closed them with gum corks through which passed two tubes of bent glass, one sufficiently long to reach the bottom of the bottle, and the other only passing through the hole in the cork, as in a common wash-bottle. Both these

tubes had in their external arms sterilised wadding. The caoutchouc corks themselves were also sterilised. The flasks or decanters were filled at the pump and carried into the Institute of Hygiene, the room in which was kept at a temperature equal to that of the well. Very careful experiments were then made upon the samples of water as to the increase or decrease of organisms, organic matter, nitric acid, etc., under conditions of repose, continual aëration, and intermittent aëration. All meteorological conditions were carefully noted, and results tabulated. These results are great in number and highly interesting in their nature. Time will not permit me here to discuss them, in fact a discussion of the paper itself deserves much more time than this meeting could allow. Suffice it for me to tabulate roughly the results of these experiments as follows:—

1st. That active and continual aëration of water does not completely prevent the development of micro-organisms in the water.

2nd. That although it may be beyond doubt that the presence of air is indispensable for the process of oxidation of the organic matter, which oxidation is, of course, brought about by the bacteria, yet the continuous aëration of a water does not contribute by itself to the acceleration of this process. In fact, while the oxidation of organic matter had not begun in a water containing few and certainly not active bacteria, and a considerable quantity of dissolved oxygen, it proceeded in the presence of many bacteria, and a considerably less quantity of free oxygen.

3rd. From all points of view no constant difference resulted between a water in which aëration took place under the influence of the temperature and pressure by mere contact of the surface with the surrounding air.

4th. The transformation of the organic matter in water occurs so slowly as not to admit of accomplishment in the mass of the water itself along the whole course of rivers, much less in the short space of time which really happens in them. The action of light exercises by itself no influence on the oxidation of the organic substances in water. On the other hand, by causing the more or less rapid death of the bacteria it retards oxidation.

5th. The effect of a temperature between zero and 6° C. unquestionably causes the death of many bacteria and arrests the development of others, which facts are proved by the decrease in numbers in rivers during the winter. Further, it appears that unless the river presents a favourable temperature for bacteria, its water in large volumes displays by its motion and mass injuries to micro-organisms which arrive in it from an environment more favourable to their health.

Concluding, he says: "By these results therefore, and from the considerations set forth, I do not believe that that auto-depuration, which under suitable conditions is manifested in rivers, comes about entirely through the process of oxidation in the bulk of the water, but it is due to a complicity of factors. To sedimentation, dilution, and to the slow and continuous process of oxidation in the bed of a river is due that self-purification of organic substances and the intermediate products of their decomposition in solution and suspension in the water.

"Up to the present one can only conclude from these various opinions that rivers in their course are purified by sedimentation and by oxidation brought about by means of organisms."

One very important lesson to be learned from a perusal of these opinions is, to my mind, the fact that there appears to be no finality to scientific research. We have seen to-night how again and again apparently logical and correct conclusions have been totally overthrown. In the history of this controversy is seen, I will venture to say, better than in the history of any other, how easy it is for investigators to satisfy themselves that they have arrived at the truth when indeed they are far from it. The various modes of inquiry followed by English and Continental workers on this subject, especially those by Professor Serafini, are surely the most logical and as near perfection as possible.

To the student of science searching after truth they are object lessons showing how to keep a straight path and yet showing how easy it is to go astray; and who can say how long it will be before other truths are discovered which will show even past deductions to have been erroneous, and which will throw a fresh light even now upon this very matter.

But be this as it may, it behoves us to keep abreast of the times. The fact of uncertainty is no excuse for ignorance. Though, as I have said, there may be no finality, there certainly is such a date as January 12th, 1894, and concerning matters up to that date it is our duty to acquaint ourselves.

Discussion on Mr. Naylor's Paper.

The President said the branch must thank Mr. Naylor for his excellent paper, his useful summary of opinions which have been held for many years, and his account of the material changes in opinion during recent years. Especially interesting were the differences in the analyses of waters between the grossly polluted Mersey and Irwell, and the Shannon which was nearly free from pollution of manufactories. It appeared to him from the tables that the reduction in organic carbon and organic nitrogen was proportionately greater in the polluted rivers than in the purer river. There was no doubt of purification of water by flowing. It would be an advantage if sufficient purity could thus be attained locally. Apparently water that had been polluted was, after filtration, sufficiently pure for drinking purposes. Of course, much of the purification which took place in flowing was but a surface purification.

Dr. Vacher said that it could hardly have been expected that opinion would have been at a standstill on this important subject since the Rivers Pollution Commissioners issued their reports. Purification due to subsidence had always been recognised as an important factor, but its extent varied much with the depth, rapidity of flow, the sharp turns in the river, the nature of the bottom, etc.

The experiments that showed there was very slight oxidation of organic matter due to the oxygen in the air and water were most interesting. That the change which takes place in the organic matter was largely due to living organisms was certainly true, but much fuller information on this matter might be gained by further experiments. Even when analysis showed that a polluted stream had become cleansed in the course of a long flow, it could not be regarded as a safe water for domestic use. The amount of pollution varied from time to time, and the cleansing powers at work did not always operate to the same extent.

Dr. KENYON joined in the thanks expressed by the President, but would have been pleased if the reader of the paper could have given an abstract of the latest results. Not only bacteria, but other familiar forms of organic life help to get rid of organic impurity in water. As long as the sewage was fresh it contained a large amount of animal and vegetable matter, which was good food and used as food. Much depended on whether the sewage discharged into a river came down fresh. If it did, then undigested animal and vegetable matter it contained was commonly eaten by birds and fishes and minute forms of aquatic life.

Dr. SERGEANT said the pollution of the Lancashire rivers referred to was great, and the amount of self-purification small in amount. In some of the rivers in the county, the fish had actually been poisoned. It was likely we should have to adhere to the opinion of the Rivers Pollution Commissioners —that there is not in the whole country a river long enough to purify itself by oxidation. We cannot say that polluted rivers are fit to drink. Considering the extent of pollution it is indeed matter for surprise that so little injury results. He had experience that diphtheria had been caused by effluvia from rivers. It had been stated typhoid fever had been caused by contiguity to foul rivers. He would be glad to know what were the effects on running streams of trade effluents. Manufacturers were being persistently attacked. It would be instructive to bear what would be the result of keeping all trade waste from the rivers.

Dr. PILKINGTON referred to the Derwent, the Mersey, and the Irwell, which underwent little or no improvement, but it must be remembered these were slow-flowing rivers, almost like canals. On the other hand in a shallow, quick-running river like the Shannon one might expect oxidation.

Dr. ARMITAGE said that the state of many local rivers was so bad, and their purification so desirable, all the members of the Society must feel interested in the subject.

Mr. BISHOP, speaking on behalf of his colleagues, said he could say that the Chemical Club was pleased to have the medical officers of health meeting in the club's rooms. It was well that the members of the two professions should join in discussing questions in which they were equally interested.

Dr. PORTER hoped facilities might be given for the two societies to work amicably together, as in each sanitary district the public analyist and medical officer of health worked. It had just been pointed out to him that as a sewer-like river flowed through the town he served, he should have something to say. He was now preparing a report on water supply, and in the course of his observations he had found that often in examining water obviously contaminated with sewage there was little to indicate such pollution chemically or bacteriologically.

Mr. NAYLOR briefly replied.

THE Birmingham and Midland Branch of the Society of Medical Officers of Health will meet at Leicester, on Thursday, April 12th, to visit the destructors; lunch together at 2 p.m.; meeting at 3.30 at the Museum, Leicester. Members of other branches are cordially invited.

ANNOTATIONS.

ENTERIC FEVER IN PARIS.—Coincident with the introduction of a purer water supply, and the diminished consumption of Seine water, there has been a diminution in the frequency of typhoid fever in Paris. From 1864 to 1880 there was a steady increase in frequency, and a rise in mortality from this cause from 53 to 147 per 100,000; but since 1880 (if we except 1883, the year of the epidemic) there has been a progressive diminution. In 1880 there were 2,120 cases, whereas last year there were only 633. In 1884 there were 3·62 deaths from enteric fever per 100 deaths from all causes; in 1893, only 1·67 (Pietra Santa). As in other countries, there has generally been an increase in mortality and sickness from this cause during the autumn and winter. This year, however, there appears to be a sudden epidemic at an unusual season. According to Lancereaux, there were three admissions for typhoid into the Hôtel Dieu from January 1st to February 12th, and 62 from February 13th to March 1st.—*Sem. Méd.*

FRENCH VITAL STATISTICS.—The population of France continues to diminish, according to some figures published in a recent number of the "Semaine Médicale," and has been seriously affected by the recent influenza epidemics. The following table gives the results for 1891 and 1892:—

	1891.		1892.
Marriages	285,458	.....	290,319
Divorces	5,752	.....	5,772
Births	866,377	.....	855,847
Deaths	876,882	.....	875,888
Excess of deaths over births	10,505	.....	20,041

The marriages gradually diminished from 1885 to to 1890, then began to rise. The births have diminished since 1876, especially since 1883. The deaths increased slowly from 1872 (when they were 800,000) to 1886, after which there was a rapid diminution for four years. Since then they have been practically stationary. There was an excess of births in 1872 of 173,000; in 1881 this had diminished to 108,000; in 1890 the influenza epidemic converted the small remaining excess into a deficiency.

HUMAN URINE AS AN INDUSTRIAL PRODUCT.—Dr. W. L. Hunter, in his annual report as Medical Officer of Health for Pudsey, draws attention to the traffic carried on in the town in human urine, which is used for scouring cloth in some of the mills. Most of the public-houses, and a large number of private people, collect urine in tubs, and this is periodically collected in special tank carts, and carried to some of the mills, where its strength is tested by taking the specific gravity, or by noting the tarnishing effect it has on a bright silver coin. It is then stored in tanks fitted with pumps, and either by itself, or mixed with pig excrement and blood, used for scouring cloth. The stored urine is known by

the trade name of "Old Wash," and the regular trade price paid by the mill owners is one penny per bucket of six gallons. Four or five bucketsful is considered to be a large amount for a private house to collect in a week. The cart contains about 60 buckets, that is, 360 gallons, and there is altogether collected about 18 to 20 carts per week. It is more difficult to obtain a quantity in summer, although the quality is better, and when obtained from private houses is considered to be better in quality than that from public-houses. The peculiar sanitary interest in the trade consists in the fact that the collecting tubs are generally close to houses, often leak or overflow, and always stink abominably. In addition to this, the carriage to the mills through the streets, especially in hot summer, is rather a serious nuisance, the carts spreading an effluvium which is exceedingly offensive, and possibly dangerous to health. There is a difference of opinion amongst cloth manufacturers as to the necessity for using this apparently primitive process. Some say that in no other way can the cloth be so effectually scoured; while others say that the work can be done as well by chemicals. If the former view be correct it is a reproach to modern science. Be that as it may, I am of opinion that unoffending people in the streets of the town, who have no interest in the profits of this peculiar business, should be protected from these disgusting stenches, by the sanitary authority insisting that the collection and carriage of the urine should be carried on at night.

Medical Aid in France.—The General Council of Public Aid has recently been reorganised by a decree of the President of the Republic. It is in future to consist of 60 members, 14 ex-officio and 46 nominated. The ex-officio members are the Directors of Public Aid and Hygiene, of Departmental and Communal Administration, of Penitentiary Administration, of Army Hygiene, of Naval Hygiene, the President of the Consultative Committee of Public Hygiene, the Perpetual Secretary of the Academy of Medicine, five Inspectors-General of Public Aid, the Director of Public Aid in Paris, and the Director of the Mont-de-Piété (or Public Pawn-shop) of Paris. Of the nominated members about equal numbers come from Paris and the provinces. They include six senators and twelve deputies, together with twenty-eight persons chosen for their special competence. The Council, which was first instituted in 1883, was divided into four sections in 1888 charged respectively with the care of (1) children, (2) sick persons, (3) old and incurable cases, inebriates, the blind, deaf and dumb, (4) the insane, the Mont-de-Piété, the Dépôts de Mendicité, etc. Each section studies questions bearing upon its own special province, and after consideration by the whole Council sends recommendations to the Senate. Anyone who through poverty or other cause is physically incapable of obtaining the means of assistance is recognised as having a claim to public aid.

REVIEWS.

Handbook of Public Health and Demography. By Edward F. Willoughby, M.D.Lond. (Macmillan and Co. 1893. 4s. 6d.)—This is an enlarged and improved edition of an old friend, Dr. Willoughby's *Principles of Hygiene*, which is now worthily honoured by appearing in the same series as the well-known manuals of Huxley, Balfour, Stewart, Lockyer, and Oliver. We doubt if any other book on hygiene of the same size contains so much accurate and carefully-arranged matter. It will be invaluable, especially for medical students who wish to have a complete and trustworthy statement of this subject within a comparatively small compass. Demography, used here as a synonym for vital statistics, is a word with which we confess we are not smitten, and we hope it will not become acclimatised in this country. The treatment of this branch of his subject by Dr. Willoughby is lucid and comprehensive. With his views on the Malthusian hypothesis we heartily agree, and we do not remember to have seen the anti-Malthusian position better stated. Dr. Willoughby's views on the mental qualities of the two sexes are very pronounced, and he makes out a strong case in favour of man retaining his mental supremacy. "Woman," he states, "is a strong, perhaps unscrupulous, partisan, but rarely capable of forming an impartial judgment." The following sentiment, though one may confess to a modified adhesion to it, will scarcely please our lady friends. "Acquisition, imitation, and execution are one thing; discovery, invention, and creation are another. The former they possess in a high degree, the latter are the prerogative of man." The only antidote which we can suggest to such pernicious (?) doctrines is a perusal of the early chapters of Sarah Grand's remarkable book, *The Heavenly Twins*. The book is singularly free from errors, but we have noted two *lapsus pennæ*—one in which Douglas Galton's stove is attributed to "Sir" Francis Galton; and the other in which Dr. S. Cameron instead of Dr. Campbell Munro is mentioned in connection with the subject of school-closure for measles.

Infectious Diseases Notification and Prevention. By Louis C. Parkes, M.D.Lond. (H. K. Lewis. 1894. 4s. 6d.)—This volume is printed in large distinct type, and has a limp cover, and the whole get up of the book is such as to induce one to view it with favour. The contents of the book do not diminish the favourable impression. It will be of great service to medical practitioners, for whom the Infectious Disease (Notification) and allied Acts have rendered indispensable a concise guide to their legal responsibilities, and the chief points of medical import in connection therewith. The first portion of the book consists of a logically-arranged summary of the legal enactments, as to notification, removal to hospital, exposure to infection, disinfection, etc. Then follows a carefully-written section on "Infectious Outbreaks in Schools," and on the more important practical details as to isolation and disinfection. The only exception to the statement that the information in the book is strictly up to date appears to be the quotation from section 88 of the Code of Regulations of the Education Department (1890). This regulation is modified by the code of 1893, as shown by the words which we have printed in italics. "The managers of a public elementary school must at once comply with any notice of the sanitary authority *or of any two members thereof acting on the advice of the medical officer of health* requiring them to close the schools, etc." The importance of this modified regulation in avoiding loss of time is obvious.

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Medical Officers of Health and other Correspondents are requested to send regularly all published reports and matters of interest bearing upon Sanitation to the Editor, 11, Gloucester Place, Brighton.

NOTICE.

THE INCORPORATED SOCIETY OF MEDICAL OFFICERS OF HEALTH.

20, Hanover Square, London, W., April, 1894.

NOTICE is hereby given that an ORDINARY MEETING of the SOCIETY will be held at No. 20, HANOVER SQUARE, W., on MONDAY, the 21st day of MAY, 1894, at 7.30 p.m, for the transaction of the undermentioned business:—

AGENDA.

1. Minutes.

2. Report of Council.

3. To Elect Candidates. The following candidates have been duly nominated for election:—

As Fellows—

WILLIAM DALZIEL, L.R.C.P., etc., Chapter Row, South Shields, late M.O.H. South Shields U.S.D.; proposed by W. H. TURNBULL, seconded by H. E. ARMSTRONG (per T. E. H.).

JOHN HEDLEY CROCKER, M.B., Ch.B.Vict., M.R.C.S., L.R.C.P.Lond., Monks Hall, Eccles, M.O.H. Eccles U.S.D.; proposed by C. H. TATTERSALL, seconded by FRANCIS VACHER.

SAMSON GEORGE MOORE, M.B., Ch.B.Vict., 12, Cambridge Street, Liverpool, M.O.H. Port of Liverpool; proposed by E. W. HOPE, seconded by FRANCIS VACHER.

As Members—

JAMES PRIESTLEY, B.A., M.B., B.Ch, B.A.O, D.P.H., R.C.S.Eng. and P.Lond., 4, St. Stephen's Road, Paddington, W.; proposed by JOHN C. THRESH, seconded by F. P. WIGHTWICK.

FREDERICK W. GIBBON, L.R.C.P., B.Hy.Durb., 87, Hudson Street, Tyne Dock, South Shields; proposed by T. EUSTACE HILL, seconded by H. E. ARMSTRONG (per T. E. H.).

J. LODGE PATCH, M.B., D.P.H., 30, Holborn Street, Aberdeen; proposed by S. R. LOVETT, seconded by JOHN C. THRESH.

7. At 8 o'clock, a Discussion will take place on "THE ÆTIOLOGY OF PUERPERAL FEVER." The subject will be introduced by Dr. Herman, President of the Obstetrical Society.

F. P. WIGHTWICK,
55, Upper Brook St., Grosvenor Sq., W. } *Hon. Secs.*
J. C. THRESH,
The Limes, Chelmsford.

PROCEEDINGS OF THE INCORPORATED SOCIETY OF MEDICAL OFFICERS OF HEALTH.

A MEETING of the Incorporated Society of Medical Officers of Health was held at No. 20, Hanover Square, on Monday, April 16th, 1894. In the absence of the President, Dr. T. Orme Dudfield took the chair.

The minutes of the last meeting of the Society on March 19th, 1894, were read, approved, and signed by the Chairman.

REPORT OF THE COUNCIL.

The HON. SECRETARY read the report of the Council, as follows:—

Your Council have to report that they have referred to the Special Committee appointed to consider various matters connected with the organisation of the Society the following resolution of the Midland Branch for consideration and report: "That the committee be also desired to discuss the advisability of so amending the Articles of Association as to more closely assimilate the constitution and conduct of the Society of Medical Officers of Health to that of the British Medical Association."

Resolved, on the motion of Dr. SYKES, seconded by Dr. ROBERTS, that the same be received and adopted.

Election of Fellows, etc.—The following gentlemen having been duly nominated for election, a ballot was taken, and they were declared by the CHAIRMAN to be unanimously elected.

As Fellows—

JOHN COWPER, M.B., C.M., Havelock House, Shanklin, Isle of Wight, M.O.H. Shanklin.

THOMAS JOHNSTONE, M.D., Annandale, Ilkley, M.O.H. Ilkley.

As Members—

WALTER DOWSON, M.D., M.A., D.P.H., 40, Prince Street, Bristol.

JOHN THOMPSON WILSON, M.B., C.M., D.P.H., 24, Oak Street, Shrewsbury.

As Associates—

WALTER HYDE, Solicitor, Town Clerk, Boro' of Stockport, Cromwell House, Heaton Chapel, Stockport.

GEORGE REDMAYNE MURRAY, B.A., M.B., M.R.C.P., 2, Saville Place, Newcastle-on-Tyne.

Nominations.—A number of candidates were then nominated for election at the next meeting.

The HON SECRETARY apologised for the absence of Dr. Ransome, and read the following paper, which had been forwarded to him :—

THE TRAINING AND QUALIFICATION OF MEDICAL OFFICERS OF HEALTH.

I.

By ARTHUR RANSOME, M.A., F.R.S.

Your secretary, Dr. Thresh, has asked me to make a few remarks on this subject. There can be little doubt of the importance of a special training for men who have to act as the medical advisers of local authorities. There is in truth often a remarkable absence of practical knowledge of public health requirements amongst the ordinary rank and file of general medical practitioners. A medical man who is intending to devote himself to general practice is probably, nowadays, well instructed in physiology and general scientific medicine, and therefore might be presumed to be acquainted with the subject of hygiene, yet such a man would probably be quite at a loss if he were called upon to decide how to deal with an outbreak of epidemic disease, to remove the causes of diseases of an epidemic origin, to protect the public from unwholesome food, to recommend, and see carried out, an efficient system of drainage, or to decide upon other methods of dealing with refuse material. He is often quite competent to declare a house unfit for healthy human habitation, or to condemn an unhealthy area, but he would be unable to point out the best modes of reconstruction or rearrangement of such dwellings. He might be able to give an opinion as to the wholesomeness of a particular water supply, from the results of an analysis, and after an inquiry into its source of origin, and yet he would not be competent himself to make the necessary examinations, chemical, microscopical, or bacteriological, of such water, and would rightly shrink from the responsibility of recommending or condemning a source of water for general use.

He requires, in addition to his school training, a special knowledge of the subtleties of infection or the natural history of infectious disease, and a habit of following up its trail or of scenting out its probable source. As Sir Thomas Browne puts it, he has to "rally the scattered causes, and that line that nature twists be able to untwine."

A glance at the regulations of any of the numerous bodies who offer examination in sanitary science, will be sufficient to show the course of extra study, which is deemed necessary for medical officers of health. Most of the universities exact a preliminary acquaintance with the principles of science, as applied to the practical work of a sanitary officer, and then pass on to the general questions relating to public health. I propose only to offer a few hints as to the best mode in which these branches of knowledge may be obtained.

First, as to the applied sciences. It would only be possible to obtain the requisite knowledge of these by a practical course of study, and, therefore, the boards of studies have rightly, at most places, insisted upon a period of six months of practical laboratory instruction.

It is to be hoped that in the various laboratories that he will visit, actual cases of pollution of air, water, or food will be presented for inquiry, and that opportunities will be given for making acquaintance with the various meteorological appliances. Bacteriology should be studied in a special laboratory, and should be as thorough as possible. Diseased meats, and other articles of food, being also examined and reported upon.

May I suggest that, in addition to this, most men find great advantage in also obtaining some knowledge of plumber's work, and in inspecting the practice, and going round with, a skilled sanitary engineer. This would not only enable him to answer questions at examinations, but would be of great assistance to him in his future work, enabling him often to put his finger upon the true source of origin of disease.

Second, with reference to vital statistics. Doubtless this is to a great extent a matter of closet work and private study, but I would strongly recommend students of public health not to rest satisfied with the text books on this subject, excellent though many of them are, but to read well around it, and to make themselves acquainted with the works of such masters in statistics as Farr, Simon, and Ogle. They will thus obtain a better knowledge of the methods of statistical inquiry, and of the multiple sources of fallacy that lurk in figures than by any other means.

A knowledge of simple methods of mathematical calculation will often also be of the greatest service. I have several times been struck with the singular terror, which seems to be inspired by the presence in an examination paper of some very elementary little piece of calculation. I would incidentally remark that a knowledge of other statistics than those simply of death and questions of population would often be of great service. The distribution of diseases, fatal and non-fatal, not only "within the United Kingdom," but with reference to particular classes of dwellings, and different occupations, is a matter which has already been inquired

into, but which needs further elucidation. Statistics also of stature, girth, and other measurements of population at different ages, may also be of great service. And, as Dr. Farr has pointed out, the relations to one another of many other kinds of figures will be useful.

Third. Similar remarks, on the mode of study, may be made with reference to applied medicine. This will mainly be a matter of private reading, but I would warn students that they should not trust to the information conveyed in the ordinary text books. Several of these will be of great service as indices to the course of reading to be pursued, but it should never be forgotten that sanitary science, like other sciences, can only be pursued by the inductive method, that it rests upon the foundation of well tried evidence as to facts, and hence no one should accept the opinions even of high authorities, but should at least pass in review the evidence through which the conclusions are reached. I have always thought that one of the many excellences of Parkes' "Practical Hygiene" was his careful array of facts, the source of which is always scrupulously given. It is thus possible and highly advantageous to refer to original documents, such as the reports of the medical officer to the Local Government Board, or to the summaries given in the army medical reports. I would point out that, though a man may be fairly convinced of the truth of received views, this is not really enough. Unless a man has himself exerted his power of judgment with regard to the balance of evidence in favour of certain things, he is not in a good position to teach others. It often happens that a medical officer of health not only has to convince his board, but the public as well, as to the propriety of a certain course of action, and he cannot do this without being himself a master of the subject. We continually find in examinations men content themselves with simply giving the orthodox views, without any attempt to support them by argument.

Fourth, sanitary law. This subject will also be a matter for private study for the most part, but in the course of his apprenticeship to a medical officer of health, a candidate will often have an opportunity of seeing the law set in action. The clauses of the different Public Health Acts imposing compulsory duties upon local authorities should indeed be especially studied. There can be little doubt that in many directions legal enactments are sufficiently stringent, and give ample powers to those in authority. The difficulty in most cases is to overcome the apathy, or, still worse, the self-interest of those entrusted with local government. And it may be a great advantage to be able to point out that certain reforms are imperatively ordered to be carried out. There is one clause that, if it could be adequately carried out, would in truth give us all the power that we could ask for, and which should be written in letters of gold in the offices of every sanitary district: "It shall be the duty of every local authority entrusted with the execution of laws relating to public health and local government, to put into force from time to time, as occasion may arise, the powers with which they are invested, so as to secure the proper sanitary condition of all premises within the area under the control of such authority" (Housing of the Working Classes Act, 1885, section 7).

Fifthly, the medical council have wisely insisted that a candidate for examination shall produce evidence of having, for six months, studied the duties of outdoor sanitary work, under the medical officer of health of a county or large urban district. This kind of apprenticeship to the work must be of the greatest possible advantage. But I hope that the restriction to outdoor practice does not exclude instruction in the manipulation of statistics, and in the writing of reports, such as the candidates will have to send in periodically to the Local Government Board. I am told that many county medical officers of health have already discovered that the reports sent in to them from sub-districts are almost valueless. Moreover, as Dr. Thresh has pointed out to me, the medical officer of health for combined rural districts are excluded from taking apprentices, and he remarks, with justice, that in large rural districts, a man has often more opportunities of investigating the origin of cases of zymotic disease, sporadic or epidemic, than he has in large towns. He asks, could the course of practical instruction be divided into two periods, three months with an urban officer, and three months with a rural officer, and would not this be an advantage? I apprehend that the answer of most of you would be in the affirmative to both questions, and I should think that there would be no great difficulty in carrying out the suggestion without an appeal to the medical council. The various boards of studies could probably make such an arrangement with the men whom they select to take apprentices.

Perhaps the most valuable part of the candidate's career will be the period of his practical apprenticeship. And it will be distinctly best that he should take it after his courses of lectures and of laboratory work, as he will then be better prepared to apply his knowledge to the problems he will meet with in actual practice. I assume that he will have access to the certificates of death and the notices of infectious disease. And if he is in earnest to get to the foundation of his subject he will visit the localities where these cases had occurred, and will endeavour to come to some conclusion as to the *causas causarum*, the true causes that have led in the one case to a fatal issue, in the other to the origin of the disease. If there be a hospital for infectious diseases he will gain a knowledge of the actual working of such institutions, the precautions which are or should be taken to prevent infection; the arrangements for heating and ventilation; and he ought also to be initiated into the actual

calculation of dietaries, and the means of procuring the best and cheapest foods for special purposes.

In hospital he will not only be able to diagnose different forms of infectious disease, but will learn the sort of inquiries which he will have to make, in order to check the notification which has been sent to the central authority. And he will be able to watch the proceedings of the medical officer of health in his endeavours to trace the sources of an epidemic.

He will accompany the various sanitary inspectors upon their rounds. He will see the various forms of nuisance commonly found, and will learn the best modes of dealing with them, and to what extent the owners or occupiers of the properties are severally liable. He will ascertain the grounds upon which certain properties are condemned by the medical officer of health as unfit for human habitation, and the methods that will have to be adopted for making them healthy; by rearrangement, and in some cases by the reconstruction of the habitations. The candidate must also visit common lodging-houses, measure their capacity, their means of ventilation and heating, and otherwise decide whether all the other legal enactments concerning them are obeyed. Similar remarks apply to cellar dwellings, slaughter-houses, bake-houses, factories and workshops, canal boats, etc.

The inspection and testing of drains, and wherever there is an opportunity, the watching of sewage systems will come within his scope. He ought to accompany the inspectors of all kinds of food, meat, milk, etc. And he will learn the details of the best modes of dealing with unwholesome aliments. It will be well also if he could accompany the veterinary surgeon, in his search for live cattle affected by different diseases, rendering them unfit for food, or for milch cows whose milk is likely to be unwholesome and to lead to diseases of different kinds. Finally, he will see in each district the method of scavenging employed, the treatment of refuse, and the disposal generally of the liquid and solid refuse of towns.

Concerning the qualification for the post of medical officer of health, it may be assumed that most men who have successfully passed through such a curriculum as I have now sketched will be fully qualified to serve. I would, however, remark that they will also need to possess tact, and *savoir faire*, to enable them to manage the people with whom they will be brought into contact.

It has been suggested that all medical officers should be required to take a diploma in public health. I am not of this opinion myself. There are many officers now serving who have proved their capacity who yet would shrink from undergoing the ordeal of an examination.

If the diploma were made a condition many valuable men would be lost to the service.

Is it not possible also that such a distinction might foster a spirit of clique, and make men ready to erect the service into a separate caste, a sort of priesthood of public health?

II.

By Henry E. Armstrong, D.Hy., Medical Officer of Health Newcastle-upon-Tyne and River Tyne Port; Lecturer and Examiner in Public Health in the University of Durham.

Having accepted the invitation of the hon. secretaries to open the discussion on Dr. Ransome's able paper—a proof of which has been sent me, it is with much regret that I find myself prevented by official duty from being present on the occasion. I beg to be permitted to offer a few written remarks on this most important question, which has occupied my attention for many years, and which, it will be in the recollection of the Society, formed the theme, under almost the same title, of my presidential address in the year 1889. The views then advanced I hold now with, if possible, firmer conviction than ever, and also with the satisfaction of feeling that they are now more generally accepted than was the case five years ago. Thus the ordinary legal qualifications for a medical officer of health, viz., those in medicine, surgery, and midwifery, have become generally recognised as insufficient. The idea that the work of such an officer is widely different from that of the practitioner of ordinary medicine, and demands different education and training, is now firmly established. The opinion that all candidates for appointment as such officers should hold proof, after an examination distinctively high in standard, of the possession of the special knowledge required, is rapidly gaining ground. The inauguration of the present debate shows how the Council regard the matter, and revives the hope that the Society of Medical Officers of Health may be about to take the active part recommended in the above address in promoting the much-needed reforms. The previously existing possibility of obtaining a sanitary qualification after a too easy curriculum, or no curriculum at all, has been recognised, and recently put a stop to by the General Medical Council. In other directions also have some of the hopes and anticipations expressed in 1889 been realised. Thus, the requirement of practical training in outdoor sanitary work for any qualification in public health is now an accomplished fact, and although clinical instruction in fever work is not yet, so far as I know, part of the curriculum for any such English qualification, except those of the University of Durham, hospitals where such instruction may be had are now open to the London student, as they have been for many years at Newcastle-upon-Tyne.

I may perhaps be permitted to repeat some of the views I formerly expressed, which cannot, to my mind, be too strongly emphasized. Thus, the range of subjects for examination which ought to be taken up by candidates for qualification in hygiene is so wide that it is very difficult, or well nigh impossible for an ordinary man to do justice to them, and at the same time comply with the requirements for the post of a medical officer of

health by holding legal qualifications to practice medicine, surgery, and midwifery (why the latter two, and especially the last, are demanded, it is difficult to conceive!). As it is laid down by the General Medical Council, that the examinations for qualifications in hygiene are to be of a distinctly high standard, the preparation of these must be in keeping. But I maintain that this cannot be done efficiently in the time specified by the General Medical Council as necessary, viz., one year after registrable qualification for the practice of medicine, surgery, and midwifery. It would, I submit, lead to a more satisfactory result if candidates were allowed to omit from their study, and were exempt from examination for ordinary medical qualification, those subjects which they do not intend to practice, viz., surgery and midwifery; and were required to occupy the time otherwise devoted to these subjects in preparing themselves in the elementary part of the work a medical officer of health has to do. The year following their "first registrable qualification" might then be well spent in outdoor sanitary duty, the clinical study of infectious diseases, the preparation of reports and legal evidence, the keeping of records, and learning other practical details, the importance of all of which seem to be as yet but imperfectly appreciated either by the authorities responsible for the scope of examinations in hygiene or those whose function it is to appoint health officers. As a preliminary, some such course as the foregoing appears desirable by way of preparation for, at least, the larger and more important health appointments. In time it should be required of every candidate for a health appointment. This would do more than anything else could to promote the needed divorce between private medical practice and the public health service, and to advance the best interests of hygiene.

If the foregoing proposal meets the approval of the Society, I would respectfully suggest that it may be specially considered at a subsequent meeting, with the view of approaching the General Medical Council on the matter.

In the election of medical officers of health, it would greatly help sanitary authorities to have some means of distinguishing between the values of the different public health qualifications of the respective applicants. Some of these qualifications have never been obtainable except after an entire year of special study subsequent to the obtaining of a registrable qualification as an ordinary medical practitioner. Others have been open to candidates without any such requirement. Naturally the qualifications with an easy curriculum have been most sought after by candidates, and hence have attained a certain reputation with the laity.

There can be but one opinion as to the excellence of Dr. Ransome's paper. The only point in it to which I venture to direct attention is the concluding passage in which he opposes the suggestion that all medical officers of health should be required to take a diploma in public health on the grounds, first, that such a regulation would drive good officers from the service; and second, that it might "foster a spirit of clique and make men ready to erect the service into a separate caste, a sort of priesthood of public health." Surely Dr. Ransome is wrong in both of his conclusions. With regard to the first, is there any proposal to require existing medical officers of health to do such a thing? And as for the second, is it not a fact that the practitioners of preventive medicine are a distinctly separate caste of their profession?

III.

By JOHN F. J. SYKES, D.Sc., M.D., M.O.H. for St. Pancras.

Having been asked to make some observations upon the knowledge with which a medical officer of health should be equipped, after Dr. Ransome's comprehensive paper, with your permission I will confine myself as much as possible to the practical side of the duties that fall upon him, assuming that he will be possessed of the necessary scientific and theoretical knowledge required of him by education and examination.

The medical officer of health is becoming more and more to be regarded as the pivot around whom the sanitary administration of a district rotates, and towards whom the main responsibility converges. The clerk of an authority learns to appreciate the opinion of a shrewd medical officer of health upon points of evidence and advice in reference to sanitary matters upon which it is necessary to base the acts of his authority.

A sanitary authority, or a committee of the authority, also learns within a short experience how valuable the carefully-reasoned opinion of a cautious medical officer of health may be when suggestively and tactfully laid before them at an appropriate moment.

Hence the medical officer of health should be a man of many parts, and cultivate plain common sense and worldly wisdom, as well as scientific knowledge and methods, to fit him to take part in public life and avoid the many pitfalls it provides. He must make himself acquainted with sanitary law, not only in its outline and bearings, but in its minutest details, wherever these details closely concern him; otherwise he may find in an inopportune moment that in some detail of inquiry, evidence, or procedure he may be tripped by someone more cautious but holding an opposite opinion.

But the most ready to appreciate his knowledge and qualities are sanitary inspectors. These officers, when in doubt, will soon learn to seek and rely upon the opinion of a medical officer, in whom they have learnt to place confidence, that he has not only a knowledge scientific in its training, but also sound in its method of judgment, and practical in its application.

Hence I would say, as an aphorism, that every good medical officer of health must also be a good inspector. This carries no derogation with it; on the contrary, if he is to be the chief he must be able to control the work of his subordinate officers, even in details, and the tendency is ever more and more to regard the medical officer of health as the chief officer in his particular department. To me it has long been clear that no medical officer of health can maintain his position with full credit unless he is equipped with that knowledge which a good sanitary inspector must also possess. It has been my lot on several occasions to hear unpleasant opinions expressed by sanitary inspectors who have served in districts where the medical officer of health was not in possession of such knowledge, but whose knowledge was purely medical.

It has been frequently stated that the requirements of public health are to provide for the purity of air, water, and food, and for universal cleanliness. A statement easily summarised, but in the complex social conditions of a crowded country difficult to bring to a practical realisation without the infringement of personal liberty to an intolerable extent. To secure the required conditions without exaggerated intolerance must be the ultimate aim. I have a pleasant recollection in early days of being warned against regarding medical patients as pathological specimens; but the future medical officer of health will not need any reminder not to regard individuals or communities in such a restricted light, so long as the theoretical and practical knowledge required of him continues to grow in the extent of its area at the present pace.

The medical officer of health, in addition to being well grounded in physics, chemistry, and biology, and skilled in medicine in all its branches, especially in pathology (human and comparative), bacteriology, and etiology, is expected to possess also a knowledge of geology, physiography, meteorology, and climatology, of statistics, mensuration, and plans, together with a certain amount of knowledge of engineering, architecture, building, and plumbing, a little more of law, local government, sanitary jurisprudence, bye-laws, regulations, procedure, and evidence, and a little more still of the industrial, scholastic, and other social conditions of life.

In order to familiarise himself with the applications of the scientific and theoretical knowledge with which he is equipped the prospective medical officer of health must seize any opportunity of visiting and inspecting various kinds of premises, their construction, condition, and occupation. Cottages, made-down houses let in separate dwellings, although not so constructed, houses specially constructed in separate dwellings, common lodging houses, model common lodging-houses cellar dwellings, garret dwellings, stable dwellings, canal boat dwellings, tents, caravans, and sheds, and insanitary houses and areas; places where food is produced, prepared, or sold, as slaughter-houses, cattle, and other markets, and retail premises, cowhouses, dairies, and milkshops, bakehouses, and school premises, various kinds of workshops, premises where the various offensive trades are carried on, nuisances, smoke, overcrowding, dampness, and many others too numerous to mention. He should take the opportunity to observe the procedure in magistrates' courts, the appearances of food, sound and unsound, and the methods of dealing with it, and the modes of sampling food and water in varying circumstances; water-sources—works, town supplies and house services; drains and drain testing, sewers, and sewage works; refuse vans, boats, depôts, and works, mortuaries, and accessory buildings; and, above all, he must familiarise himself with communicable diseases and the preventive measures they require, infectious hospitals, ambulances, disinfecting stations, apparatus, and accessories.

If every opportunity be taken to inquire into and inspect the municipal works and methods in every town he may find himself, and of inspecting and examining into every preventive process he may come across, the future medical officer of health will find this knowledge of inestimable value in the practical, every-day opinion, and duty his sanitary authority will require of him.

In this manner he will come to be regarded by his authority not as one of the theorists, that formerly a medical man was almost invariably classed amongst, but as a practical adviser and a trustworthy executive officer.

In addition to this he must make every endeavour to fit himself for public life, which requires the display of some qualities less necessary in private life, and must be content to very patiently await the result of constantly repeated efforts to obtain such reforms as he may recommend.

It must also be added that he should look and press for adequate remuneration for the skill acquired by much labour and perseverance, for public health demands in its service medical men highly specialised in education and training.

Discussion.

The Chairman observed that the Society was much indebted to the gentlemen to whose papers they had had the pleasure of listening. But the ideal Dr. Ransome had set before them was one which he thought almost impossible of realisation under present conditions, and certainly there were no rewards in their department of professional work at all commensurate with the time, money, and labour which would have to be expended in such a scheme of education and training as had been outlined in the paper. As he listened he could not but remember the words of their President in his inaugural address, showing how absolutely uncertain was the tenure of office of most of

their colleagues. Few of the salaries, moreover, given to medical officers of health were large enough to tempt an able man to specially qualify himself as Dr. Ransome considered that the ideal medical officer should be qualified; and when the position was obtained there was no security that it would be permanent. The President had stated that, according to a return published in 1888—

> More than 1,000 medical officers of health were appointed year by year; about 230 had a tenure of office ranging between two and five years; 112 held their appointments indefinitely, or at the pleasure of their authorities; and only 45 were appointed permanently, of whom but one was the officer of a large combined district, devoting his whole time to his duties; while as regards salaries, no less than nearly 900 of those officers who were not debarred from private practice received amounts ranging downwards from £50 to (in ten instances) less than £5 per annum, 358 ranged between £50 and £100, 275 received from £100 to £200, and only 25 exceeded this amount.

It had, he believed, been the intention of Parliament, when the Public Health Act of 1875 was before the House, that all provincial health appointments, the same as medical appointments in the poor-law service, should be permanent, and it was only at the last moment, so to speak, that it was decided that the first appointments should be made for some period not in any case exceeding five years. But the Act had never been amended in this respect, and their President had shown how few medical officers enjoyed that best of privileges, security of tenure. The officer appointed for a limited term, if he made himself objectionable to his authority—say by a too energetic discharge of his duty—could be got rid of without difficulty. They need not reappoint him, and the thing was done. In London, under the provisions of the Public Health Act of 1891, all new appointments were permanent, and in the case of officers appointed to large districts fairly good salaries were given, private practice being forbidden. Such officers might reasonably be expected to possess some approach to the ideal qualifications Dr. Ransome desiderated. Outside London, with no security of tenure, and too often with a rate of payment which was discreditable, this was impossible. The time, then, had surely come for the Society to take a practical view of the position, and to strive by every means to secure for all medical officers of health permanency of tenure, and salaries adequate to the services required. The tendency of the day was towards reduction rather than to increase in the remuneration of medical officers of health, and a salary as low as £200 had been proposed for a "whole-time" appointment. Thanks to the action of the Local Government Board, such a discreditable proposal was impossible within the metropolis; and every effort should be made to obtain legislation which should make it impossible outside London. He had the greatest respect for Dr. Ransome; he admired his counsels of perfection; he would not presume to criticise his paper; he preferred rather, from the theoretical point of view, to sit at his feet, as at those of a master; but he ventured to say that the conditions of office must be revolutionised before his ideal could be realised in practice. In conclusion, he would again urge the Society to take up those questions of the position and the remuneration of the medical officer of health, and to agitate—for nothing was done nowadays without agitation—until matters had been arranged to their satisfaction, on a basis commensurate with the importance of the office they had to administer.

Dr. NEWSHOLME thought that the pecuniary prospects of those engaged in the public health service, to which reference had been made by the Chairman, were not such as to encourage any demand for increased qualifications on their part. Under the present conditions it could hardly be expected that the public health service would be recruited from the more highly qualified members of the profession, or that these, if they joined their ranks, would remain. On the general question of the training of medical officers of health, he was of opinion that they were in danger of making too little of the purely *medical* aspects of their work. There was a distinct danger of the public making one group of officers—so called "sanitary officers"—losing sight of the fact that for the efficient performance of the work of a medical officer of health a complete medical training was required. The essential preparation for their work consisted in a well-grounded knowledge of pathology and preventive medicine. Other qualifications might be added, this was indispensable. Some medical officers of health were skilled in the work of sanitary engineers, others were skilled chemists (and the speaker had no objection to the voluntary combination of the posts of medical officer of health and public analyst, where special aptitude for the latter work was proved), others were trained lawyers. Everyone to his particular liking; but the one thing essential was a thorough knowledge of medicine in all its branches. He thought the best medical officers of health were those who had either been previously engaged in general medical practice, or at least had been resident medical officers of fever hospitals; and who were thoroughly competent to assist their fellow-practitioners in the diagnosis of doubtful cases of infectious disease. It would be a great pity if in the future we had a body of men who, instead of taking up surgery and midwifery, were allowed to take up public health as an alternative.

Dr. THRESH referred to the suggestion made by Dr. Ransome that embryo medical officers of health should serve an apprenticeship, and he thought it was desirable that some of it should be served in rural districts. The medical officer of a rural district has a number of duties which do not come under the medical officer of an urban district; the water supply, for instance, in an urban district is under the charge of an engineer, but in

any large rural district you have a number of different forms of water supply which constantly require the attention of the medical officer of health. In the matter of infectious diseases you have far greater opportunity of getting at the cause of a disease in a rural district than in a large town; again, if the district is a large one there would probably be more than one method for the disposal of sewage; besides which they had to remember that fully half the medical officers of health were in rural districts, and yet they were training them for urban.

A vote of thanks to the writers of the papers brought the meeting to a close.

PROCEEDINGS OF THE NORTHERN BRANCH OF THE INCORPORATED SOCIETY OF MEDICAL OFFICERS OF HEALTH.

A MEETING of this branch was held in the Board Room, Hexham, on March 16th, 1894. Present: Dr. Henry E. Armstrong (president), Drs. Boustead, Jackson, Turnbull, Stainthorpe, Gibbon, F. W. Gibbon, Wilson, Stokoe, Arthur, Squance, Liston, and Eustace Hill. Drs. Stainthorpe and Jackson and Dr. Mears, of Edinburgh, also attended the meeting,

The report of the Council, which included the following resolution, was received and adopted: "That the Council of the Northern Branch is of opinion that as the whole question of the representation of the branches on the Council of the Society, and the relation of the branches to the Society, is about to be considered by a representative committee of the Society and of the branches, it is unnecessary to appoint representatives to the committee suggested by the Council of the Birmingham and Midland Branch."

A letter was read from the Hon. Secretaries of the Society announcing that several important subjects had been referred by the Council of the Society to a committee representative of the Society and its branches. It was resolved that the action of the Council in appointing the committee be approved, and that the President and Hon. Secretary of the branch do attend the meeting as representatives of the Northern Branch.

The following gentlemen were elected to the branch:—

As Members—

J. B. FISHER, M.B., M.O.H. Whitehaven U.S.D.

A. W. ATTWATER, M.R.C.S., M.O.H. Whickham U.S.D.

As Associate Member—

F. W. GIBBON, B.Hy., L.R.C.P., Tyne Dock.

As Associates—

ADAM WILSON, F.R.C.S., Newcastle-on-Tyne.

H. W. NEWTON, L.F.P.S., J.P., Newcastle-on-Tyne.

W. Dalziel, L.R.C.P., formerly M.O.H. South Shields, was duly nominated for election as a member of the branch.

The following paper was then read:—

INSANITATION AS A MEANS OF HEALTH (IN CHINA).

Notes of an Address by W. P. MEARS, M.A., M.D., late Lecturer on Anatomy in the University of Durham Faculty of Medicine.

The Empire of China contains a quarter of a million more square miles of area, and sixty millions more of people than Europe, and presents as great diversities of scenery, climate, and population. In the north and north-east are vast, densely-peopled, highly cultivated plains; in the north-west, equally vast, sparsely populated sandy deserts, all with an average shade day temperature of 105° F., or more in summer, and of zero or less in winter. Across the centre from west to east extends the broad valley of the Yang-tsze river, containing a line of great cities and towns, the marts and exchanges of the empire. In the south-west and in the south-east are mountainous regions, reaching well within the tropics, the former continued toward Thibet and Burmah, the latter forming chiefly the province of Fuh-Kien, separated by a meridianal tongue of lake country and undulating lands. In each of these divisions the population presents special and distinctive racial peculiarities, caused by the varied conditions under which they were at successive epochs driven southward by wave after wave of invasion from the north.

The speaker had lately returned home after living and travelling for two and a-half years in the south-east region just mentioned, that is to say, in the province of Fuh-Kien, and to that region he confined the remainder of his remarks.

The province of Fuh-Kien, one of the smallest of the eighteen provinces of China Proper, is about as large as England, with as numerous a population. In physical aspect the country consists of a mass of abrupt razor-backed and peaked mountainous ridges, from 2,000 to 6,000 or more feet high, formed of granitic rock, covered by scanty, clayey soil, with narrow, deep, gorge-like intersecting valleys. Deforestation has been carried out completely during the last century or two for a hundred miles or more inland, with the result that the rivers have silted up with sand and grit; the bays and inlets, some of them 30 miles deep, have been converted into lakes, and the coast has been lined with mud-banks miles in breadth.

As to the Climate: From November to February the weather is fine, rainless, moderately dry (75 per cent. humidity), with a temperature of 50° to 55° F. (day shade); in March and April it is variable, moist, and rainy; in May and June, hot, with air supersaturated with moisture and heavy rains; in July and August, clear and hot, a humidity of 70 to 90 per cent., an average day shade temperature of 92° to 95° F., and a night temperature of 80°

to 85° F.; in September and October, hot and variable. The prevailing characteristic is moist heat, with light to fresh easterly breezes (north-east in winter, south-east in summer). The annual rainfall is under 40 inches.

The people, densely crowded in places—*e.g.*, numbering 2½ millions or more in Foo Chow (the capital), its suburbs and environs—are well built, hardy-looking and stalwart in physique, blunt in manner, and very independent in character, reminding one much in many ways of Northumbrian pitmen. Their dress is usually of cotton only, several suits being worn in the colder weather. Their food consists of boiled rice and sweet potatos as the staple, mixed with salt fish (sun-dried and high in flavour), shell-fish, goat-flesh, pork, fowls, frogs, cats, rats, and any other animal food procurable, very many varieties of vegetables, especially beans (eight varieties) and peas, fruits, and an assortment of condiments. Wheat, millet, maize, and barley are largely grown, and in the form of flour are used to make bread-cakes. The diet is really very well varied in character, and is always well cooked. The exigencies of life render careful and good cooking a necessity of existence. In China no waste is permissible. The drink taken is tea, very different to the manufactured article intended to suit European taste, and free from the dangers of the latter. Those who can afford it take wine in small quantities (also heated) with their food. During the two and a-half years of the speaker's life amongst the people he never saw a drunken man. The industry and perseverance of the Chinese strike every foreigner forcibly. From dawn till dusk (4 or 5 a.m. till 7 p.m.) every man, woman, and child appears to be continuously at work, and that, too, Sunday and week day alike, except for two or three days at the New Year. The vast bulk are of the peasant or crofter class, living in communes which possess the fullest powers of local government in all aspects. Hence comes, no doubt, the independence of character. So long as there is no serious trouble the officials are conspicuous in absence. There are no imperial taxes, except a small annual land-tax. Communal expenses are covered by an equable division of the amount of actual expenditure amongst the heads of families concerned. Every district is generally, so far as supplies go, self-contained as well as self-governed. The people of each having thus to rely for the necessaries of life on their own resources are to a man engaged in procuring these necessaries, and are, therefore, chiefly agriculturists.

Every inch of practicable ground is cultivated. The high roads are thus reduced to paths, often only two or three feet broad. The mountain sides, rising steeply, are cultivated, even up to an angle of 40° or more in places, in continuous series of narrow, shelf-like terraces, often only a few feet in breadth, for 2,000, 3,000 feet, or more upwards. Cultivation is carried down over the sand-dunes to high-water mark on the coast. The speaker has seen peasants carrying sea-sand on to the ledges of rocky cliffs, and raising in beds so formed crops of potatos, beans, and peas. Four crops a year are raised off the same ground year after year, and have doubtless been so raised for centuries. Pasture or fallow-land is never seen. There are, therefore, no horses (except those of officials), nor cattle, nor sheep.

This agricultural success is due of course to sewage farming. This is carried out in some districts by a dry, in others by a moist method. All excreta are collected in open buckets, two forming a load for one man, and are sold to the cultivators for about threepence or fourpence a bucket—that is to say, each bucket is equal in value to about one-twentieth of the monthly income (say 7s.) of an ordinary family. These buckets are regularly collected by the buyers and carried through the streets to the fields, still uncovered, of course. In the fields, under the moist method, the contents are emptied into bottle-shaped, cemented cesspits, 10 ft. deep by 8 ft. wide at the bottom, and there left to ferment. Under the dry method they are mixed with ashes of vegetable refuse, etc., and worked in sheds into a dry, highly-concentrated powder. The seeds for cereals, young plants, etc., are all dibbled in by hand at about 9-inch intervals, together with a small quantity of this manure, are watered with urine twice a week, and are remanured as occasion demands. Every plant and every handful of growing cereals is attended to separately. Under the moist method the fermented material in the cesspits is diluted with urine, and a little poured in with each plant or group of seeds as these are inserted. As the crop approaches maturity, or immediately on its removal, another crop is planted in the interstices of the former, and the same process repeated. The rice crops, of which two are grown in each season, spring up under water, not only in the valleys, but in the terraces right up the mountain sides. The terraces are lined with a puddled clay edging to retain the supply of water. Hence, under a tropical sun and constant manuring, malaria is developed wholesale.

As to Habitations: The towns are generally situated on rivers, whilst the villages are found stowed away in the valleys, always at the foot of a hill. The low hills near the cities and towns are the cemeteries. The Foreign Settlement at Foo Chow is nothing but a cemetery filled overfull. The houses, as a rule, face south (so as to be warm in the colder weather), generally of one floor. They are oblong in shape, and are usually constructed, without foundations, of timber-framing with lath and plaster filling, mud end-walls, and tiled roof. They consist of a central hall, wide open to the front, and of lateral bedrooms, cabin-like and unlighted. In the houses of the mass of the people the floor of the central hall is of earth

or soft cement. In front is a square court, sunk a foot or two feet, and often paved, with lateral small outbuildings or kitchens. The whole is surrounded in better-class houses with a high mud wall. There is no drainage. The soil-buckets stand at one side or at the back. The houses of the peasantry have the main building only; those of the rich a series of two or three of such ranges of buildings, one behind the other. The streets are only alleys, 6, 8, or 10 feet wide, flagged with narrow granite blocks like curb-stones. They are undrained, except for a central channel, without any particular fall, under a row of central loose flagstones, which are removed and the channel emptied when the latter gets inconveniently full. Kitchen and other refuse is thrown into the streets in heaps in any place where it can be deposited without interfering with the traffic, to be routed over by the pigs which swarm everywhere, and in due time, when it has become worth removal, to be carried off for agricultural purposes. These streets are crowded all day by a multitude of passers-by. The accidental upsetting of soil-buckets is a frequent occurrence. Public latrines (open cesspits enclosed in low walls) and urinals occur at frequent intervals, put up, of course, by interested parties.

As to Water Supply: Water, if not procurable from rivers or streams, is obtained from shallow surface wells, six to thirty feet deep. In the houses these are almost always placed close to the kitchens, alongside the refuse, and a few feet from the cesspit latrine. The speaker described the water of one well which he tested, in consequence of the invaliding of a European, as going mouldy like soup on standing in a covered vessel for a few days; and as containing, when fresh, epithelium flakes, much growth of mycelium, etc., and rapidly growing masses of spores. Another well, much recommended for the clearness (a comparative term only) of the water—as an alternative to a similar well to that last described in use by Europeans—was in a public street, and only six feet deep, situated within some twelve feet of a street channel, like that before mentioned, from which channel it obviously received its supply. The Chinese themselves never, if they can avoid it, drink cold water, but always take it boiled as in their tea or rice, and never wash in cold water. All food is also generally eaten hot, after boiling or cooking in oil. The water of the streams has previously circulated through the hill terraces and lower cultivated grounds. It has a peculiar greyish, dirty colour, and is, of course, loaded with organic matter.

As to Health: Considering the absence of any sanitary conditions whatever, it might be supposed *a priori* that the Chinese would suffer very seriously in consequence. As a matter of fact they are in many respects very healthy. Hence the title given to the paper. Any partial attempts at improvement would doubtless lead to grave sanitary disaster. For the comparative health of the people their open, active, out-of-door life, the free and minute exposure of all refuse and sewage to sunlight and air, the careful cooking of all food, and the great moderation of the natives in alcohol drinking may to some extent account. It is impossible for many reasons to give even approximately the birth and death rates amongst the Chinese. Undoubtedly, however, whilst the latter is great, the former is greater; for the population in the intervals between famines, pestilences, and civil wars, steadily increases. The diseases from which they suffer are in the first place and chiefly due to neglect and utter absence of any art of medicine (to say nothing of surgery) properly so-called. Their cotton clothing and open houses make them peculiarly subject to rheumatism, which is, perhaps (next to skin and eye affections), the most common disease. Their manure-grown vegetables necessarily give them worms, from which they all suffer, apparently, at various times. Small-pox (in a light form usually) and measles are recognised as universal maladies, to be got through with as soon as possible. Children are, therefore, allowed to contract them for prophylaxis sake. Ague is very common, and is as severe with the Chinese as with Europeans. Remittent bilious fever is endemic in some localities, and is often very fatal. In a native city, where the speaker lived, it was said to have carried off, a few years previously, one-third of the male population. Females were not reckoned in. Dysentery and typhoid fever also occur, together with various intestinal affections, not infrequently. Cholera is more or less endemic. Its origin is referred by the Chinese to the year 1820 A.D., when it suddenly broke out in the province of Shan-Tung, in the extreme north-east of the empire, and thence swept westward to Central Asia. Typhus fever is rare. Diphtheria, erysipelas, pyæmia, septicæmia, etc., are unknown. To these dangers the surgeon need never give a moment's thought. The people as surgical subjects are singularly healthy. Major operations of the severest kind, ovariotomies, etc., may be and are performed under circumstances in every way the reverse of antiseptic, and may be confidently expected—unless on account of some untoward accident or condition in connection with the operation—to succeed. The children of Europeans are particularly healthy and strong. The climatic conditions for them seem to be quite different from those of India. As it is, the Chinese of Fuh-Kien, taken all in all, are a fine race, physically and mentally, presenting many characteristics akin to those of Anglo-Saxons; capable of and willing to undergo an immense amount of fatigue even on a spare and poor diet, of resisting extremes of climate as well as an Englishman, and —like, perhaps, the bulk of their countrymen—of causing no small trouble in the future (as General Lord Wolseley anticipates) to Western nations,

now that they have begun to assimilate and develop Western ideas.

Dr. ARTHUR, in moving a vote of thanks to Dr. Mears for his excellent paper, said he had come the greatest distance of anyone present, and he did not grudge it. Knowledge was cheap at any price, and he had never before had the pleasure of learning anything whatever about the medical affairs or the sanitary condition of the "Heathen Chinee." Human nature was evidently the same in China as in the County of Durham. He had known mothers place their children beside others having measles "to get over it quick," the same as Dr. Mears told them the Chinese mothers did in the case of small-pox. He considered Dr. Mears' paper as a considerable addition to his own knowledge.

Dr. SQUANCE, in seconding the motion which was carried unanimously, said that Dr. Mears' paper was both interesting and educational.

On the motion of Dr. ARMSTRONG, seconded by Dr. GIBBON, a hearty vote of thanks was passed to the Hexham Local Board for granting the use of their room, and to Dr. Jackson for the arrangements he had made for the meeting.

After the meeting the members dined together at Hexham.

PROCEEDINGS OF THE NORTH-WESTERN BRANCH OF THE INCORPORATED SOCIETY OF MEDICAL OFFICERS OF HEALTH.

THE annual meeting of this branch was held in the rooms of the Chemical Club, Manchester, on Friday, April 13th, at four p.m. The following members were present: Drs. Paget (in the chair), Adams, Anderson, W. H. Barr, Deans, Edlin, Graham, Hope, Niven, Porter, Tattersall, and Vacher.

The minutes of the last annual meeting were read and confirmed.

A letter was read from Mr. Lees Knowles, M.P., acknowledging the receipt of the resolution sent him in favour of the Plumbers' Registration Bill.

A letter was read from Dr. A. M. Eason, of Lytham, thanking the branch for the resolution of sympathy accorded to him.

A letter was read from Dr. J. J. Bailey, medical officer of health for Marple, resigning his membership of the branch, owing to relinquishing general practice and leaving the neighbourhood.

Letters were read from Drs. Barnish, Hannah, Heslop, Kenyon, Littlejohn, Sergeant, Steeves, Pilkington, and Robertson regretting their inability to be present.

Sir George Augustus Pilkington, Chairman of the Public Health Committee of the Lancashire County Council, nominated by Dr. Sergeant at the last meeting, and seconded by Dr. W. H. Barr, was duly elected an honorary member.

Dr. Alfred Taylor, medical officer of health for Little Lever, nominated by the Hon. Treasurer at the last meeting, and seconded by the Hon. Secretary, was duly elected a member.

The following nomination was read: John Hedley Crocker, M.B. and Ch.B. (Vict.), L.R.C.P.Lond., M.R.C.S.Eng., L.S.A., M.O.H. Eccles, U.S.D., proposed by Dr. Tattersall, and seconded by Dr. Paget.

The Hon. Secretary then read the report of the committee for the year 1893-94.

ANNUAL REPORT.

In presenting their annual report, the committee rejoice that they are able to record the continued success and efficiency of the North-Western Branch of the Incorporated Society of Medical Officers of Health.

The medical officers of health for districts in Lancashire, Cheshire, Derbyshire, and the West Riding of Yorkshire have had an experience of thirteen years of associated work independent of the Society of Medical Officers of Health, and have now completed six years' work as a branch of that society. The labours of the year under review compare not unfavourably with what has been achieved in any previous period of twelve months. The North-Western Branch is actuated by the same spirit as the North-Western Association, and its aims are similar. The main objects of the organisation, as originally set forth, were to afford local medical officers of health a ready means of intercommunication, and to enable them to co-operate for the furtherance of sanitary work. Both these objects have been consistently kept in view—individually, members have been given opportunities of advising one another on points of law and custom, expediency and special knowledge, while, collectively, they have been given exceptional opportunities for guiding the public judgment. The committee do not doubt that the good services rendered the profession and the community are most beneficial, and have been appreciated. No less than twelve members have joined the branch during the year, making an exceptionally large addition to the number of members. Their names, given in the order of election, are as follows: Drs. Armitage (Darwen U.S.A.), Porter (co. Borough of Stockport), J. Barr (Bolton R.S.A.), Etches (Borough of Macclesfield), Marsden (co. Borough of Birkenhead), Pilkington (Preston U.S.A.), Winn (Fylde R.S.A.), Stephenson (Prestwich U.S.A.), Hayward (Haydock U.S.A.), Moore (Liverpool Port S.A.), Park (Dukinfield U.S.A.), and Taylor (Little Lever U.S.A.). Only two members have resigned—Dr. Tatham, on leaving Manchester to take up his appointment as superintendent of statistics at the office of the Registrar-General, London, and Dr. J. J. Bailey, who is resigning as medical officer of health for Marple and leaving the district.

The committee record with deep regret the death of Dr. Henry Welch, who joined the North-Western Association in 1884, and was elected president of the branch in 1890. (See also page 273.)

Early in the year Sir Francis Sharpe Powell, Bart., M.P., was elected an honorary member of

the branch in recognition of the great services which he had rendered to public health in the county of Lancaster. Another well-known name has this day been added to the list of honorary members—Sir George Augustus Pilkington, Knight, Chairman of the Public Health Committee, Lancashire County Council.

Two associates have also been elected during the year—Mr. J. Carter Bell, F.I.C., who was of great assistance to the branch in arranging for meetings to be held at the rooms of the Chemical Club; and Mr. F. Scott, the Secretary of the Manchester and Salford Sanitary Association.

There are at present five honorary members, 53 members, and 21 associates.

Ten ordinary monthly meetings have been held during the year. There were no meetings during August and September, the usual intermission being allowed on account of holiday absences.

At the first monthly meeting of the year three very important steps were taken. The branch resolved :—

1. To discontinue holding its meetings at 44, John Dalton Street, and, if possible, to arrange for holding meetings henceforth at the rooms of the Manchester Chemical Club.

2. To dispense with the services of a paid secretary, and invite Mr. F. Scott to be an associate and an honorary secretary of the branch.

3. To discontinue inviting the representatives of the Press to the meetings of the branch.

As a result of these resolutions all the monthly meetings after the first have been held at the Manchester Chemical Club. Mr. Scott retired from the secretaryship and continued to be connected with the branch as an associate, and newspaper reporters have ceased to be present at the meetings. Owing, no doubt, to the more comfortable accommodation at the club rooms, the attendance has considerably improved.

It was also resolved that the day of meeting should be the second Friday in the month, instead of the third Friday. The object of this was to give a little additional time for the printing of the minutes and papers at the end of the month.

In April, 1893, the President delivered his inaugural address, taking for his subject "The History of the North-Western Branch of the Society," a most interesting *résumé* for which he received the best thanks of the branch. This address was afterwards printed by the president as a pamphlet and presented to the members and associates. The annual meeting was followed by a dinner at the Grand Hotel, at which Dr. Ransome, F.R.S., Professor Delépine, and other distinguished guests were present. The committee are pleased that the custom of having an annual dinner has been revived, and trust it may be continued.

At the May meeting the President read a criticism on the Sanitary Registration Bill, which was followed by a discussion. The outcome was the passing of resolutions drawing the attention of the central Society and Sir F. S. Powell to the unsatisfactory nature of the Bill, and requesting their influence in opposing it.

At the June meeting Dr. Sergeant read a paper on "The Infectious Hospitals Bill." The terms of the Bill and Dr. Sergeant's comments thereon were debated, and a resolution passed expressing approval of the Bill.

At the July meeting the Public Health Acts Amendment Bill (for the better regulation of common lodging-houses) was discussed, and the branch expressed its general approval of the amendments proposed.

The following important papers have been read before the branch during the year :—

"Small-pox Problems," by Dr. Niven.

"History of an Epidemic of Typhoid Fever, including Consideration of the Means of Prevention of the Disease in Midden Towns," by Dr. Porter.

"Infectious Sore Throat or Diphtheroid or Diphtheria," by Dr. Jordan.

"The Growth of Opinion on the Self-purification of Rivers," by Mr. Wm. Naylor.

All these papers formed the subjects of interesting debates, and the first terminated by the passing of a resolution affirming that small-pox hospitals should not be on the same area as hospitals for the treatment of other infectious diseases, and that they should also be at a distance from centres of population.

A special debate was also arranged on the administration of small infectious hospitals, which was opened by Drs. Anderson, Sidebotham, and Porter, and proved exceptionally interesting.

As regards the *personnel* of the branch there is little to record. In October Dr. W. H. Hughes resigned the hon. treasurership of the branch, which he had held since April, 1887. His resignation was accepted with regret, the best thanks of the branch being tendered to him for his services extending over a period of six years. Dr. F. E. Adams was selected to fill the vacant post, and appointed unanimously. In November Mr. Fred Scott was presented with an engrossed address and a cheque of £15, the branch considering his retirement from the secretaryship a favourable opportunity for offering him a small token of regard in grateful remembrance of his many past services.

In conclusion the committee have again to remind the members that the usefulness of the North-Western Branch must depend in great measure upon the extent to which it represents the sanitary service of the very large area covered by the branch. The committee would therefore urge all to do their utmost to add to the roll of members.

FRANCIS VACHER, *Hon. Sec.*

The report was adopted and ordered to be printed.

The Hon. Treasurer then read his statement for the past year. The balance-sheet, having been duly audited, was read and passed. It showed that the Hon. Treasurer had a balance in hand of £17 3s. 4d. This was deemed satisfactory.

A vote of thanks was passed to the retiring president and the committee and officers for their services during the past year. It was stated that the great increase in the number of members who had joined and the increase in the average number present were due to the personal efforts of the retiring president.

Dr. Paget said it was a great pleasure to him to see the branch growing in importance and usefulness, and he hoped any improvement which had taken place would continue year by year.

Dr. Hope then proposed as President for the ensuing year Dr. A. Jasper Anderson, Medical Officer of Health for Blackpool. This was seconded by Dr. Niven, and carried unanimously.

The new President then took the chair, and thanked the branch warmly for the honour conferred upon him.

Dr. Paget proposed Dr. Vacher as Vice-President. This was seconded by Dr. Adams, and carried unanimously.

Dr. Vacher suitably acknowledged the honour conferred.

Dr. Graham proposed, and Dr. Tattersall seconded, Dr. Adams as hon. treasurer and Dr. Wheatley as hon. secretary. This was agreed to unanimously.

On the motion of Dr. Anderson, seconded by Dr. Porter, the following gentlemen were appointed as other members of committee for the ensuing year: Drs. J. Makinson Fox, J. H. Gornall, W. Graham, E. W. Hope, G. A. Kenyon, W. H. Hughes, H. H. Littlejohn, R. McNicoll, J. Niven, C. E. Paget, J. Rhodes, E. Sergeant, C. H. Tattersall, and H. H. Vernon.

Dr. Anderson then delivered his inaugural address on

The Past, Present, and Future of the Position of Medical Officer of Health.

A resolution "That the best thanks of this branch be given, and are hereby tendered, to the President for his interesting address," was proposed by Dr. Niven, seconded by Dr. W. H. Barr, and carried unanimously.

Annual Dinner.

After the annual meeting the members of the North-Western Branch of the Incorporated Society of Medical Officers of Health dined together at the Grand Hotel, Manchester.

Dr. A. Jasper Anderson (Blackpool), president of the branch, was in the chair, and the following members were also present: Dr. Armitage (Darwen), Dr. W. H. Barr (Bury), Dr. Deans (Ramsbottom), Dr. Edlin (Levenshulme), Dr. Etches (Macclesfield), Dr. Graham (Middleton), Dr. Hope (Liverpool), Dr. Niven (Manchester), Dr. Paget (Salford), Dr. Porter (Stockport), Dr. Tattersall (Oldham), Dr. Taylor (Little Lever), Dr. Vacher (Cheshire), and Dr. Wheatley (Blackburn). There were present as guests: Councillor R. C. Smith, M.D., J.P., Dr. Thomson (Coroner for Oldham), Dr. Crocker (medical officer of health for Eccles), Mr. Carter Bell, Mr. J. T. F. Bishop, and Mr. John Hardcastle. The first toast, "The Queen," was given from the chair. The second toast, "The Incorporated Society of Medical Officers of Health," was proposed by Dr. Hope and responded to by Dr. Vacher. The third toast, "The President of the Branch," was proposed by Dr. Niven and responded to by Dr. Anderson. The fourth toast, "The Victoria University," was proposed by Dr. Porter and responded to by Dr. Paget. The fifth toast, "The Guests," was proposed by Dr. Barr and responded to by Dr. Smith and Mr. Carter Bell.

PROCEEDINGS OF THE BIRMINGHAM AND MIDLAND BRANCH OF THE INCORPORATED SOCIETY OF MEDICAL OFFICERS OF HEALTH.

The quarterly meeting of the Midland Branch of the Incorporated Society of Medical Officers of Health was held on April 12th, at the Museum, Leicester. The members met shortly after one o'clock, and, accompanied by Dr. Priestley, and Mr. E. G. Mawbey, the borough surveyor, had a drive to the refuse destructors and the new pumping station. The chair at the subsequent meeting was occupied by the President (Dr. Boobbyer), and there were also present: Drs. Priestley, Iliffe, Reid, Littlejohn, Barwise, Richards, Bailey, Blumer, Clarke, Underhill, Robinson, De Denne, Copestake, and T. H. Harrison; Alderman Windley, Alderman Clifton, Councillor Biggs, and Mr. Mawbey, borough surveyor, Leicester.

Dr. Reid read a resolution passed at a meeting of the Council held in March recommending that a meeting of delegates from the general Society be held at Manchester to consider certain matters affecting the representation of provincial branches on the Council of the Incorporated Society.

The President explained that the suggestion was that the importance of provincial branches should be more recognised in future than it had been in the past; in fact, that the whole Incorporated Society should consist of several branches, and not, as at present, of one portion which took upon itself an authority which really belonged to the whole.

In reply to Dr. Iliffe, who asked what good would come of it, as they were all members of the Incorporated Society, the Chairman said the pro-

vinces were not sufficiently represented in comparison with the metropolis on the Council of the Parent Society, there being twelve metropolitan members and only twelve provincial members.

The meeting unanimously resolved on adopting the suggestion of the Council.

The paper abstracted below was then read :—

On Enteric Fever in Leicester.

By Joseph Priestley, B.Sc., M.D., M.O.H. for Leicester.

In introducing his subject, Dr. Priestley said he proposed to treat it from a hygienic point of view, giving a short account of Leicester's previous typhoid history, and a more detailed account of the 1893 epidemic. During the last 40 years there had been registered in Leicester 1,742 deaths from the typhoid group of diseases, including 1,637 from typhoid, 25 from typhus, and 80 from fever not specified. There had been a gradual decline in the number of deaths from the typhoid group of diseases from 650 in the period between 1853 and 1862 to 236 in 1883 92, and that decline had gone on *pari passu* with improved sanitation. In 1849 the number of uncovered soil pits in Leicester amounted to 2,900, with an aggregate surface of 1¼ acres, the population then being about 60,000. To-day there were only about 30 middens left in the old borough, and an elaborate system of drainage was approaching completion. The added areas of the borough had given 61 cases and four deaths from typhoid during 1893. Whilst it was generally admitted to be a filth disease, chiefly associated with defective drainage, yet he believed that it had a tendency to become epidemic at intervals, due to atmospheric or tellurial influences. The Leicester epidemic periods had been at intervals of about four years, from 1853 to 1893. In the latter year the epidemic was exceptionally severe, not only in Leicester, but also in other large towns in the kingdom.

After enumerating various causes of typhoid, Dr. Priestley said that in Leicester during the past year many, if not all, of the unfavourable conditions had been present more or less. The excessive and long-continued drought contributed materially to that condition, inasmuch as the scarcity of water led to deficient sewer and drain flushings and watering of streets. After further explaining the origin of typhoid, and the ordinary means of infection, he said that in consequence of the limited hospital accommodation in Leicester many cases had been left in the town, with the result that each case had, as a rule, become a centre from which others had arisen in the immediate vicinity. Out of a total of 406 cases he had no difficulty in tracing 108, namely, 26·6 per cent., to pre-existing cases. In investigating some of those direct infection cases he was struck with the proportionately large number of infected houses supplied with pails as against those provided with w.c.s. The proportion of typhoid infected persons in houses in the former as compared with those where the sanitary arrangements were better was three to one. Proceeding to show the necessity for improved sanitary conditions, he pointed out that in Leicester—the extended borough—there were 2,000 middens, 7,000 pails, 12,000 w.c.s, 10,000 dustbins, and 12,000 ashpits, and he looked forward to w.c.s with bins entirely superseding all the other arrangements—an alteration that could be effected at a considerable saving to the rates. In this case the plumbing work must, of course, be perfect. They were fortunate in Leicester in having at least a main sewerage system capable of allowing such an alteration, though some of the tributary sewers were defective and would in all probability require reconstruction.

In order to improve the sewerage system, they were closing open grids wherever possible, and running up shafts, but something more satisfactory would have ultimately to be carried out. There was the usual autumnal exacerbation last year, the number of cases running up from 28 in the first quarter to 49 in the second, and 204 in the third, and dropping to 125 in the fourth. From investigations he had found that the greatest increase was in the Woodgate district, which has a population of 7,763, the number of infected houses being 46, and the cases 66. Certain sewerage alterations had been conducted in that district during the year, which necessitated some lengths of old sewers being opened, and their contents exposed to the air ; but while there was no evidence to prove that such operations started the epidemic, there was no reasonable doubt but that they intensified it. The Woodgate (western) main was opened on July 23rd, and finished on August 21st, whilst the sewer in Bradgate Street was opened September 12th, and closed up again in a few days by order of the Sanitary Committee. In both cases the ground would be open about a week previously. The typhoid cases in that district were notified as follows: January, 2; February, 2; March, 0; April 0; May, 2; June, 5; July, 12; August, 13; September, 19; October, 7; and December, 2; whilst of the July cases 10 occurred in the latter, and 2 in the former part of the month; of the August cases 12 occurred in the former and 1 in the latter part of the month ; and of the September cases 13 occurred in the latter and 6 in the former part of the month.

Dr. Priestley proceeded to consider how these facts fitted into his theory. A typhoid exciting cause appeared in the Woodgate district on July 16th, and continued until August 14th. An interval of three weeks then occurred, followed by the appearance of a similar cause. On September 5th, and continuing until about September 16th, allowing 12 days as an average incubation period for typhoid, they would expect that the cases would crop up in numbers at the end of July and during

the first half of August, and that they would abate then until about September 17th, when they would again increase in numbers until about the end of September. What did they find actually occurred? From July 28th to August 16th there were 21 cases; from August 16th to September 8th, 3 cases; and from September 8th to October 1st, 19. It was probable, of course, that infected pails in that neighbourhood also played a part, whilst some of the cases appeared to be connected with the fact that children bathed and paddled in the Anstey Lane effluent from the sewage farm. That effluent might have been specifically infected, though up to the standard required for such effluents. The geology of Leicester had played an important part in distributing the typhoid cases. The town stood upon gravel, sand, and clay, and it was found that the greatest number of typhoid cases occurred on the sand and gravel.

It had also been suggested that the typhoidal cases had grouped themselves along the courses of portions of some old ditches, which had been described as elongated underground cesspools. Such ditches undoubtedly received, and since being covered in even now appeared to receive, drainage from certain properties. The typhoid cases did not appear to have been influenced by those ditches, but he was glad to say the Corporation were abolishing even the small portions of them that remained. A far more serious state of affairs was to be found in the case of some if not all of the tributary sewers, which were said to be defective, leaky, and badly constructed. They were to be found more especially in the district between Belgrave Road and Humberstone Road, including Wards II., III., and IV., and there had been 139 cases of typhoid in that district. Round the vicinity of Martin, Birstall, Argyle, and Dorset Streets the incidence of typhoid had also been heavy. In Martin Street ten houses were typhoid-infected during the epidemic, representing 16 cases. The level of Leicester in that neighbourhood was 175 to 180 feet above the level of the sea, and the sewers were old—though cleansed within the last ten years—being probably in part again silted up and semi-stagnant, ventilated on to the surface of the roads by means of the defective water seals of the gullies, owing to the dry and hot weather. Such a state of affairs would favour the pollution of the ground—air, and water, and the atmosphere generally in that neighbourhood. Some of these sewers were opened by Dr. Priestley's advice and found to be silted up, varying from 11 to 2 inches of silt in 15-inch brick sewers. The highest points of our sewers did not form typhoid centres—an experience at variance with that of some other towns, *e.g.*, Stockport (*vide* PUBLIC HEALTH).

Dr. Priestley, after dealing with the great importance of efficient ventilation of drains and sewers, proceeded to point out the practical immunity of Stoneygate, Highfields, Southfields, and Clarendon Park, which he thought was due to the sewers in those highlands having steep gradients, and being consequently self-cleansing. Careful investigation had failed to connect any of the cases with a polluted milk supply, and the water supply had been up to its usual quality. The age incidence of the attacks was the remarkable and striking feature of the epidemic. Thus 209 out of 406 were 15 years and under, whilst 153 were 12 years and under. In conclusion, Dr. Priestley said that the lessons to be learned from their 1893 epidemic of typhoid were: 1. Strict isolation of all cases in hospital, if not possible otherwise. 2. Prompt and efficient disinfection, with subsequent careful disposal of all discharges by cremation. 3. Cleanliness (domestic and municipal) in its widest sense by the prompt removal of all decomposing animal matter and excreta from the immediate vicinity of the dwellings, and by the carrying out of extensive sewerage alterations only in cold weather, at least, as far as practicable. Although there had been in Leicester an epidemic of typhoid, the stringent precautions that had been taken had limited it—a result which, in his opinion, would have been much more successfully accomplished had they had more hospital isolation accommodation.

DISCUSSION.

The PRESIDENT said there was no better index to the perfection of sanitary arrangements, especially in urban districts, than the amount of typhoid which occurred in that district.

Dr. ILIFFE said, from his experience at Derby, his opinion with regard to the infectivity of typhoid did not coincide with that expressed by Dr. Priestley, and he did not attach much importance to the removal of cases to the hospital for the sake of preventing the spread of the disease.

Dr. CLIFTON did not think half of the 406 cases returned in Leicester last year were really typhoid cases. He regarded many of the cases as a kind of malarial fever following on the influenza which prevailed during the early part of the year. He also disagreed with the idea that typhoid was infectious.

Dr. REID spoke stroogly of the necessity of having the best possible sewerage arrangements.

Mr. MAWBEY, in referriog to the present sanitary arrangements in Leicester, stated that during the time he had been connected with the town about two-thirds of a million sterling had been spent in improving those arrangements, which, considering the alterations entailed was no light task. The pail system cost them in Leicester a little over £3,000 a year; but if they substituted water closets it would mean a considerable annual saving to the ratepayers. The ventilation of the sewers had also been considered, and he did not think Leicester would be behind in spending as much money as might be necessary in carrying out a very effective system of ventilation.

Alderman WINDLEY did not think the supersession of pails would necessarily mean the entire removal of the epidemic from the town.

Dr. BARWISE concurred with Dr. Priestley as to the causes of typhoid, and the effect of the drought of last season in increasing the epidemic. He suggested that there should be something more than a chemical analysis of water in order to ascertain its purity.

Dr. LITTLEJOHN said that where cases of typhoid fever were treated at home in small houses, without an opportunity of isolation, they were exceedingly apt to spread amongst the other members of the family. He strongly recommended water closets for sanitary purposes.

Councillor Biggs did not think the number of cases of typhoid necessarily was a criterion of the health of the town. He hoped some means would be found for discovering the real cause of the prevalence of typhoid. Although last year there was a considerable prevalence of typhoid, they would find that there was an absence of other infectious diseases.

Dr. Priestley briefly replied.

Dr. Boobbyer then read the following paper:—

An Epidemic of Small-Pox Traceable to Fomites in Nottingham, 1894, and a Diagnostic Sign of Importance.

By Phillip Boobbyer, M.B.,
M.O.H. for Nottingham.

In December of 1893 there occurred a small localized epidemic of small-pox, almost exclusively confined to inmates of, and persons having entry to, the County Lunatic Asylum at Sneinton, on the eastern outskirts of the town. There were twelve cases, with dates of onset all within a period of ten days, and two deaths. These cases were promptly isolated, and by the end of the month the outbreak appeared to have ceased. On January 15th "a suspicious case" was notified to me as existing in a closed yard in the very centre of the old town, and close to the Lace Market. I at once proceeded to the spot, and in the course of half an hour discovered eight cases of undoubted small-pox in the yard and its near neighbourhood. All but two were of very recent date; the exceptions (those of husband and wife) were some three and five weeks old respectively, and the first had certainly derived its infection from one of the asylum attendants who lived outside that institution. These original cases had been treated as some form of simple ecthyma by a well-known medical man of the town, and he had even exhibited them as such to other medical practitioners.

All the cases were at once removed to the isolation hospital, their homes disinfected, and as many of their friends and neighbours vaccinated as could be persuaded to consent to the operation. While making house-to-house visitation in this neighbourhood, I discovered a large quantity of cotton material sent out by wholesale firms in the town for various kinds of treatment at the work-peoples' homes. Wherever such material appeared to have been in contact with infected persons or things, I insisted on removing it for disinfection.

This rough material taken home by outside employés of the warehouses appeared such a ready vehicle of the small-pox virus, that I decided to visit the warehouses having dealings with the affected area without delay.

Upon making inquiry I discovered that two warehouses only were having such dealings with the infected yard and its neighbourhood at this time, the reason for this being that many houses send their material to contractors, who sublet it in turn to their immediate neighbours, thus confining certain areas to certain houses of business. I visited the warehouses in question and obtained permission to examine the employés. I also secured a list of absentees from work at the time of my visit, and during the preceding few weeks. Something I heard at the warehouses concerning the two less recent cases already mentioned led me to revisit the yard at once, with the view of clearing up certain points in their history. I now discovered definitely that the wife's attack (of very mild varioloid) had commenced about December 12th, and the husband's (of well-marked discrete pustular small-pox) about eleven days later. I found that these two people had worked at the cotton goods in their own home throughout their illnesses, and had sent in a large amount of them through the contractor to the warehouses on the 3rd and 6th, and other later dates in January. I subsequently learnt that one of these people was actually at this time secreting a considerable amount of these goods with a view of returning them to the warehouse through the contractor, and this notwithstanding the fact—of which she was fully aware—that through her case had arisen the whole epidemic. This woman, I am pleased to say, was successfully prosecuted under section 126, Public Health Act, 1875.

I returned to the warehouse that had received the first consignments (January 3rd and 6th), and asked what had become of the goods. I learnt that they had all been made up in one room, that part of them remained in stock, and part had gone away abroad. I obtained possession of the part remaining in stock, and proceeded with my investigations. I asked about the work people in the making-up room above-mentioned, and learnt that fifteen girls and one youth, out of a total of twenty-seven usually working in this room, were absent through illness. I had previously obtained a list of absentees, but now discovered for the first time that they were practically all from one room. I next examined all the employés in the house, ninety odd in number. Three of the eleven remaining in the making-up room were affected with small-pox rash—mild, aborting varioloid; these were at once removed to hospital, and I further proceeded to look up the home cases. Without wearying you with unnecessary detail, I may say that, by the end of the ensuing four days, my principal infectious diseases inspector and I had succeeded, with the aid of only two ordinary notifications, in discovering the whereabouts of and examining all the other absentees from the making-up room, sixteen in number. They all had small-pox almost contemporaneously, and they all went to hospital. I had in the meantime visited and examined the employés at the second warehouse mentioned (which received later consignments of goods from the married couple first infected), but with an entirely negative result, and other subsequent visits and inquiries were equally satisfactory.

A few secondary cases appeared after the above, but by their discovery and isolation the epidemic was brought to a close. A very few other cases

have occurred in Nottingham since; the infection, however, has been traceable to other sources. Our small-pox wards would have been empty yesterday, but for the importation of a fresh case from Gravelly Hill, Birmingham.

There are, I think, several special points of interest about this epidemic. The first is connected with the mode of transmission of the virus from the yard to the warehouse. This transmission was undoubtedly effected through the cotton goods sent in on January 3rd and 6th by the husband and wife first affected, for there was no other conceivable vehicle, and all the nineteen cases subsequently occurring in the making-up room at the affected warehouse had onsets between the 14th and 23rd. The rash of the husband was commencing to scab about the 6th, and he admits that he helped his wife with the work all through his illness. As the second warehouse mentioned had received cotton goods from these people at a later date without any further cases resulting, it is, I think, to be inferred that but little effective poison could have existed in the later scabs of the man, although these were even continuing to form after his admission to hospital on January 15th. I may say in passing that I am strongly of opinion that the infective stage of even acute small-pox does not last so long as is commonly supposed. Another point is the mildness of type which prevailed among the warehouse patients and the apparent shortness of the incubation period in some of them.

While examining the affected employés—who were mostly adults—I was much struck by these features. All but one, indeed, had been successfully vaccinated in infancy, but only two had been revaccinated; still, there was not a confluent case among them all, and most of them had extremely modified rashes. The exact incubation period was hard to determine in the majority, but as three of the mildest cases apparently began to develop within eleven days of exposure to infection, and as one exhibited what appeared to be an inoculation sore on the lip, I came to the conclusion that several of the girls had inoculated themselves; the possibility of this, indeed, was accentuated by one of the principals at the warehouse passing his thumb from the material to his mouth in the process of stretching and flattening it to show me how the work was done.

While speaking of mild cases, I am reminded of the old question, which is so often put and so often answered, How are we to distinguish between modified small-pox and chicken-pox? Now, I will not weary you by even enumerating the well-known points of distinction, none of which are entirely satisfactory criteria to the inexperienced observer, but I will tell you of one sign which, in and after the vesicular stage, has seldom failed me, and which is especially well marked in the modified and aborting cases. I refer to the peculiar, polished, absolutely circular, and sometimes rayed scab, which is never seen in chicken-pox, but which is invariably seen to a certain extent, especially on the upper extremities, in all those cases already alluded to, which are likely to be otherwise difficult of diagnosis. I have successfully diagnosed small-pox by one such scab in the palm of the hand of a girl who had no suspicion of having suffered from the disease, but who had been exposed to infection, and who subsequently proved to be insusceptible to vaccination. I may add that a botanic magnifying glass, which I always carry, has often proved an invaluable aid to me in diagnosis.

This discoid scab in all its stages is quite unmistakable. I have found it commencing to shape inside the vesicle as early as the third day of rash, and with the aid of a glass it can often be seen forming up from the bottom of the vesicle, where it appears to originate in and around the retaining bands connecting the skin beneath with the epidermal covering over the vesicle. Dr. Fagge describes the vesicles as falling in to form the scab, but the process I refer to is quite different from this. The old hornpock again had reference apparently more to the sebaceous, and often acuminated scabs, so frequently seen on the face in modified small-pox, and not to these flattened discs.

The peculiar circumstances of this epidemic enabled me to hunt up the cases for the most part without the aid of my medical brethren, and also without in any way offending against recognised rules of medical etiquette, for I had a large proportion under observation before the development of any definite symptoms, and many actually isolated before the appearance of rash, *i.e.*, of the small-pox rash proper. It is probably due to the opportunity I had of early observation that I am able to record so large a proportion of prodromal rashes. No less than fourteen out of the thirty-seven total cases in this epidemic exhibited more or less of this symptom, mostly in the measly and scarlatinal forms—one was of the transient and finely spotted hemorrhegic type, and very dark in the axille and groins, but the case made a good recovery without grave symptoms at any stage.

The last point of interest I will draw attention to is the teaching this small epidemic conveys of the undoubted advantage to the sanitary authority and the public where the medical officer of health and his staff are given a free hand to search out and follow up cases, instead of being under the necessity of waiting for their too often tardy notification.

Dr. RICHARDS expressed his entire agreement with the paper, and Alderman WINDLEY and Councillor BIGGS congratulated Dr. Boobbyer on having been so successful in suppressing an outbreak which had for the time somewhat alarmed them in Leicester.

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PROCEEDINGS OF THE METROPOLITAN BRANCH OF THE INCORPORATED SOCIETY OF MEDICAL OFFICERS OF HEALTH.

A MEETING of the above Society was held at No. 197, High Holborn, on Thursday, April 12, 1894, at four o'clock. Present: Dr S. R. Lovett, president, in the chair; Drs. H. L. Bernays, Louis Parkes, E. Gwynn, T. Orme Dudfield, James Herron, G. P. Bate, Francis Allen, G. E. Yarrow, Shirley F. Murphy, Sidney Davies, and H. W. Roberts.

The minutes of the last meeting on January 15th were read, approved, and signed by the chairman.

The HON. SECRETARY reported that a meeting of the branch had been convened for Thursday, the 5th inst., but that as a sufficient number of members to form a quorum had not attended, no business had been transacted.

The HON. SECRETARY read the following letter from Dr. Manley, hon. secretary of the Birmingham and Midland Branch:—

RE CONSTITUTION OF SOCIETY OF M.O.H.

West Bromwich, March 29th, 1894.

Dear Sir,—Since my circular letter to the branch, dated January 20th, 1894, the Central Council have appointed a sub-committee to consider certain alterations proposed in the Articles of Association. The Council of this Branch are desirous of taking this opportunity for further discussion, and have proposed a further alteration to the Central Council, as follows: "That the sub-committee be also desired to discuss the advisability of so amending the Articles of Association as to more closely assimilate the constitution and conduct of the Society of M.O.H. to that of the British Medical Association."

We are also anxious to hold such a conference of Branches as I proposed in my last letter, and would suggest the Chemical Club, Manchester, as a convenient place, and April 28th (Saturday), at three p.m., as a convenient date. Three representatives of each Branch are invited to attend.

There will thus be ample opportunity for a full interchange of views on these questions before the meeting of the sub-committee in May.

As my Branch meets at Leicester on April 12th, I shall be glad of a reply by that date.—I am, yours faithfully,

HERBERT MANLEY,

Hon Sec. B. and M. Branch, Society M.O.H.

Hon. Sec., Metropolitan Branch.

After considerable debate, it was moved by Dr. DUDFIELD and seconded by Dr. HERRON and resolved *nem. con.*, "That in the absence of any information as to the changes which are thought by the Council of the Birmingham and Midland Branch to be desirable in the articles of association, and of the other matters referred to in the letter this day submitted to the Branch, it is deemed inexpedient to take any action thereon."

The branch then proceeded to consider the letter from the hon. secretaries of the Parent Society as to certain matters affecting the constitution of the Society, which had been referred to a sub-committee for consideration and report, and asking the views of the branch thereon. The hon. secretary read the letter referred to. The various matters were then considered *seriatim*, and the following resolutions were arrived at:—

1. "That any alteration in the constitution of the Council would involve an alteration in the articles of association, which this branch is of opinion is undesirable."

2. 'That this branch disagrees with the resolution of the Yorkshire Branch, that matters of general interest and importance be referred to the branches before action is taken upon them by the Incorporated Society.

3. "That the branch considers the payment of the expenses of representatives attending the Council meetings in London is undesirable, and that the present subscription to the Society would be insufficient for the purpose."

4. "That the branch disagrees with the suggestion to extend the eligibility for Fellowship of the Society beyond that provided by the articles of association."

Resolved, that the foregoing resolutions be embodied in a communication to be forwarded to the Hon. Secs. of the Society in reply to their letter.

The branch then proceeded to consider the London Streets and Buildings Bill.

After discussion, and various clauses of the Bill having been explained by Mr. Shirley F. Murphy, it was resolved that the branch agree generally with the clauses relating to open spaces, that they would be willing that one or more of their members should be deputed to give evidence before the Select Committee, and that further consideration of the matter be referred to a sub-committee with powers to act, such committee to consist of the President (Dr. Lovett), Dr. Louis Parkes, Dr. Allen, and Dr. Bate, and that Mr. Shirley F. Murphy be invited to attend the Committee.

The branch then adjourned.

(End of Proceedings of the Incorporated Society of Medical Officers of Health.)

CRABS AND ENTERIC FEVER.—The following particulars are taken from the annual report of Dr. F. W. Clark, M.O.H. for Lowestoft: The "Bethel" with a crew of eight hands was fishing off Grimsby on or about September 6th, when in the port of Grimsby they exchanged a last of herrings for some crabs from a Grimsby crab boat, the crabs having been caught at the north entrance of the Humber. All ate heartily of them except one man and all with the exception of this man were attacked the same night with cramps, vomiting, and diarrhœa. Four of them continued to suffer from diarrhœa and were unable to continue at work. They landed at Lowestoft on September 12th, and during the following week were all reported as suffering from enteric fever. As this occurred at the time that cholera prevailed at Grimsby the incident was invested with more than usual interest, while it serves as an additional illustration of the fact that shell-fish gathered near the sewage outfall of a town will, if eaten, occasionally account for an outbreak of zymotic disease, the origin of which would otherwise be very obscure.

Public Health.

ON THE RELATION BETWEEN THE MEAN QUARTERLY TEMPERATURE AND THE DEATH-RATE.

In a recent paper read before the Royal Meteorological Society, Mr. W. H. Dines, B.A., gives statistical evidence in favour of the well known rule that a cold winter is unhealthy and a warm winter healthy. He gives a tabular statement of the departures from the average of the quarterly death-rate and of the quarterly mean temperature. From this table it appears that while sixteen winters conformed to the rule, twelve were exceptions to it, and in the remaining four an exact average value occurred. Mr. Dines says we have during the thirty-two years "six well-marked examples and five well-marked exceptions to the rule," and he wisely adds, "I hardly think the figures justify our stating the relation as a rule at all." With this conclusion we entirely agree. The method adopted is indeed one not calculated to bring out the real relationship between temperature and mortality. The mean temperature for thirteen weeks may express the average of widely divergent temperatures or of a fairly uniform series. That cold has a striking influence in increasing the mortality, especially of the aged, can be easily proved by reference to the weekly returns of the Registrar-General for London.

With Mr. Dines' conclusion as to the relation between summer temperature and the death-rate we have no reason to disagree. A hot summer is always unhealthy, and a cold summer unhealthy. In this quarter of the year the mean temperature for the whole quarter gives an approximation to the truth, as there are not likely to be any great extremes of temperature on the minimum side.

The Budapest Co-operative Trip.—Dr. Lunn is pressing forward with the arrangements for the co-operative party to Budapest at the end of August next. The cost of the tour will be, as already announced, twenty guineas. This sum will include second-class railway ticket, first-class on steamer, and first-class hotel accommodation at all the following places: Cologne, Mainz, Nuremberg, Vienna, Budapest, Munich, Frankfort, and Brussels. The party will travel up the Rhine to Mainz, and down the Danube from Linz to Vienna and from Vienna to Budapest. Special arrangements are also being made for those who wish to do so to take the extension on the return journey from Munich to the Austrian Tyrol. Dr. Lunn's brother, Mr. Holdsworth Lunn, will proceed to the Tyrol and to Budapest in the course of a few days to make all the necessary arrangements.

The Rome Congress.—Dr. Woodforde, the President of the Incorporated Society of Medical Officers of Health, not having returned from Italy, was unable to preside at the April meeting of the Society, his place being taken by Dr. Dudfield. Al the accounts of the Rome Congress agree in stating that the arrangements made were quite insufficient to meet the requirements of the case. In view of this partial break-down of the Congress arrangements, it augurs well for the success of our co-operative trip to Budapest, that a large number of medical men, including Dr. Woodforde, have addressed a letter to Dr. Lunn, expressing their "high appreciation and hearty thanks for the able and courteous supervision over the party, and the arrangements made for their comfort both on the journey and during the sojourn in Rome."

Dilapidated and Unhealthy Houses in Southampton.—We have received from Mr. A. Wellesley Harris, the M.O.H. for Southampton, an elaborate report, "setting forth," in accordance with the instructions of the Council, "in full the number of dilapidated houses within the borough." While sympathising with Mr. Harris in the enormous special work which has been imposed upon him, and congratulating him upon the thoroughness of his report, we cannot help thinking that the Town Council have not taken up this question in a business-like manner. It is evident that they can, for some years to come, only deal with a very small section of the houses, streets, and courts on which Mr. Harris has laboriously reported. Much unnecessary labour might have been avoided had the Town Council allowed their medical officer to make official representations as to the worst of these houses and courts for prompt treatment, thus clearing the way for the fuller discharge of their duties under Part II. of the Housing of the Working Classes Act. The details given in the report show the necessity for immediate action. We hope that the gigantic nature of the task which is here revealed will not deter the Town Council from at once commencing at some one point.

The Institut Pasteur.—According to the report recently published in the *Annales*, there were 14,430 persons treated for bites of mad animals from 1886 to 1893 inclusive, with a mortality of ½ per cent. The vast majority were French; under 200 coming from other countries. Of these most came from Spain and Greece, smaller numbers from England and Belgium. For prevention of anthrax over three and a-quarter million sheep and over 400,000 cows and oxen were treated since 1882, with a mortality of less than 1 per cent. for the sheep and ⅓ per cent. for the others. Before this the annual mortality from anthrax was 10 per cent. and 5 per cent. respectively, so that the inoculation method has resulted in a saving of at least five million francs for the sheep and two million francs for the bovine animals

DARWINISM AND RACE PROGRESS.

A Criticism.

By John F. J. Sykes, D.Sc., M.D.

In the last Milroy Lectures Professor Berry Haycraft has displayed great boldness in attempting to grapple with the questions of heredity, variation, and survival and their effects upon the future of the race. The lectures are full of thought and suggestiveness, but the lecturer appears to have been conscious that such extensive subjects could scarcely be compassed by three lectures without abbreviating the train of reasoning by which he arrives at his conclusions. If, therefore, readers are apt to misread, it may be attributed to the fact that so many points that are involved have not been sufficiently elaborated for want of time and space, and it leaves it open to suggest that the train of reasoning may conceal fallacies not observable upon the surface. Professor Berry Haycraft sums up the effects of heredity by stating that purely local acquired characters are not transmitted, but acquired constitutional conditions may be transmitted provided they affect the germ cell; these he terms "acquired germinal variations" in contradistinction to "innate germinal variations," of which the causes are unknown. That environment may act upon a race—firstly, by giving preference to certain innate qualities of certain members, and so by selection and survival determine the production of the race from these; and, secondly, by varying the general well-being of the offspring through the parental blood. The latter is surely the heredity of acquired variation, with the proviso that the variation must affect the germinal cells of the parent. Yet, whilst Professor Haycraft holds that mankind was profoundly mistaken in dreaming of the elimination of disease by the transmitted effects of good hygienic conditions, he at the same time holds that good food and healthy exercise will enrich the blood and endow it with energy, and the germ cells may suffer change in common with other tissues depending for their vitality upon the general well-being of the body.

The lecturer discusses the effects of micro-parasitic organisms, and holds that the organisms causing measles, small-pox, chicken-pox, scarlet fever, typhus fever, and typhoid fever are selective agents, inasmuch as they prevent a larger number of weak than of strong children from growing to maturity, and contributing to the production of the next generation. At the same time he holds that the microbe of typhoid fever, unlike that of leprosy, will attack a man who is healthy and living in healthy surroundings, excepting for the microbe that lives in his well; and that the microbe of syphilis, unlike the microbe of leprosy, but like that of measles, feeds on healthy blood and tissue; that leprosy attacks anyone living under certain unhygienic conditions; remove these conditions—as we have done long ago—and the bacillus of leprosy disappears; its duties are over, like the extinct plants and fishes in the rocks. From these and other like facts Professor Haycraft draws the conclusion that preventive medicine is producing race-decay. That preventive medicine is not regarded in any narrow sense is evident, since he speaks of preventive medicine and civilisation together, and he summarises by saying that on account of improved external conditions, and notably the sanitary advances due to the efforts of preventive medicine, the race is deteriorating in general constitutional robustness.

As the lecturer regards pathological microbes as our race friends rather than as our foes, it would be interesting to know whether he regards over-crowding as beneficial. The invariable result of overcrowding is to produce an environment favourable to pathological organisms (especially those of typhus), which attack the community, killing some, maiming some, and deteriorating the health of others. Is Professor Haycraft prepared to maintain that impure air, water, and soil, darkness, dampness, and foulness are friends of the race, since they are favourable to many microbes, and test the resistance of human beings exposed to their influences?

The Professor enters at some length into the question of the heredity of the quality of immunity acquired by attacks of infectious diseases. It might be worth while discussing the effects of all the many varieties of acquired immunity, since each particular disease that confers immunity produces its own, but for the fact that he comes to the conclusion that there is no reason to believe that the germinal cell may be affected in these diseases. Therefore, so far as acquired immunity is concerned, *cædit quæstio* and only selection obtained by resistance and survival remains.

In reply to the lecturer's conclusion that infectious diseases maintain the robustness of the race, and prevent race-decay by killing the weakly, quite a number of apposite questions may be asked. Do not the more weakly die the more readily under all influences inimical to life? Does not one infectious disease and its concomitants, whilst killing some, maim many, and weaken many more, so that they may readily fall a prey to another disease? Is age predisposition, and the attack of the young and susceptible, synonymous with the attack of the weakly? Do not many infectious diseases acquire progressive virulence as they spread, and especially as they spread through persons of increasing ages? Many other and similar questions might be asked if space permitted. But Darwin's generalisation was drawn from facts, not from ideals. The survival of the fittest refers to environment. This may be ideally bad, and the ideally bad may survive. If it be desired to modify the environment so that the ideally fit may survive only, or may alone reproduce, it then becomes a question of what is the ideal fitness and

what is the ideal environment desired. Is ideal fitness to be robustness, and the ideal environment to be hardship to secure it? Is the more hardy hunting mountaineer to be considered more fit to survive than the less hardy agricultural plainsman? Are the works of war to be considered fitter environment than the arts of peace? The only true test of fitness within the Darwinian meaning is survival, and the only test of environment is that form which secures survival. The saving of life has been ever the keynote of curative medicine, and remains the ultimate aim of preventive medicine. If Professor Haycraft's conclusions be correct, then not only is preventive medicine wrong in combating unfavourable environment to protect health against deterioration, but curative medicine is also wrong in combating disease of the body to protect and prolong life.

THE HERMITE SYSTEM OF TREATMENT OF SEWAGE.

By Chas. Kelly, M.D., F.R.C.P., M.O.H. for the Combined Sanitary District of West Sussex.

In accordance with your request I have examined carefully the process which has lately been carried out in Worthing for the treatment of sewage by M. Hermite.

The whole of the plant has been erected under the direction of M. Hermite, and the method adopted is that carried out by the inventor himself, so that this report does not deal with the treatment of sewage at the outfall, nor with the mixed sewage of a town, but only with such sewage as the author of the process has seen fit to include.

The Hermite solution is obtained by the partial electrolysis of sea water. Two galvanised iron tanks, each capable of holding 1,000 litres, or 220 gallons, are placed side by side, while between and above them an electrolyser is placed in a small metal box. There are four rows of vertical rods, covered in their lower half by a mesh of fine platinum wire, which dip into the sea water contained in the box; each row contains eleven such rods. Between these rows circular discs of zinc revolve when the machinery is in motion. The current, generated by a dynamo, which is driven by a portable steam engine, passes through the sea water between the electrodes of zinc and platinum, and in doing so it is said to decompose the magnesium chloride, and so to produce a disinfecting fluid.

A gallon of ordinary sea water contains about 2,275 grains of combined chlorides in solution, of which magnesium chloride amounts to about 256 grains, the rest being nearly all sodium chloride. It is stated that the magnesium chloride is alone decomposed, and that the sodium chloride serves as a conductor. It takes about 2 to 2½ hours to convert 220 gallons (1,000 litres) into a disinfecting fluid of a strength equal to 0·75 grams of chlorine per litre, but M. Hermite says that a solution containing 0·30 grams of chlorine per litre is sufficient for his system. No account is given of the chemical nature of the substance produced by his process; it is said to be an oxygenated compound of chlorine, but no chemical formula is given. The solution has a smell of a weak solution of bleaching powder, and M. Hermite contends that his solution is of a similar nature, with this difference, that magnesia takes the place of lime in a bleaching fluid.

Bleaching fluid is a solution of chlorinated lime; and his solution may then be called chlorinated magnesia. In each case hypochlorous acid seems to be produced in combination with a base, and this acid is one of the compounds of chlorine with oxygen.

When good commercial bleaching powder is treated with distilled water, a certain proportion is dissolved, and this fluid will give a strength equal in effect to 25 or 30 grams of chlorine per litre.

Such a liquid gives off a strong smell of hypochlorous acid, and it has active bleaching power when treated with a diluted mineral acid.

The strongest Hermite solution which I have examined contained 0·75 grams of chlorine per litre, or 0·52 grains per imperial gallon.

On several occasions the strength was much less, amounting only to 0·22 grams of chlorine per litre, while in most of the experiments a strength of 0·44 grams to 0·51 grams was obtained, or a quantity in excess of that (0·30 grams), which it is claimed will suffice for disinfection.

The strength of this standard may be better understood when I say that it is sixty times weaker than a saturated solution of good bleaching powder. The Hermite solution loses its strength when kept for a few days, even in closed vessels; two such samples lost nearly one-twentieth of their strength in two days.

The solution contains no free chlorine, as has been often alleged, and it does not redden litmus paper; it will decolorize sulphate of indigo at once, and its strength is thus ascertained:—

A solution containing a known quantity of arsenious acid is taken, and of this 5 c.c. are placed in a small glass beaker, into which two or three drops of indigo solution are added, so as to give the liquid an intense blue colour. On adding the Hermite solution no change in colour takes place until the arsenious acid is changed into arsenic acid, and when this is completed the blue colour disappears and the liquid turns to a pale yellow brown colour. The strength of the solution can thus be quickly ascertained; the weaker the solution the more is required for decoloration.

When treated with dilute hydrochloric acid, it gives off chlorine, and it will then bleach reddened litmus paper.

There is no treatment of sewage by electricity as in Webster's method. Electricity is only used to decompose the sea water, and the altered sea water so produced is allowed to act chemically on sewage.

The process has only been carried on upon a small scale in West Street. In Yard A the dynamo and the tanks are placed, and then the electrolysed fluid is pumped up into some store tanks, whence it is distributed for use as occasion may require.

In Yard B two new water closets have been recently put up, and these are in direct connection with one of the syphons used in the process.

In Yard C is a second syphon, also sunk in the ground, which receives the treated sewage from the similar syphon in Yard B, and also the ordinary sewage from fourteen cottages in West Street.

The store tanks in Yard A are filled from the dynamo tanks; they are made of galvanised iron, and the water is distributed from them to the flushing tanks, but not to the sinks of each cottage.

There is also a galvanised iron pipe (attached to the public water main) which leads to one of the store tanks, and thus the tanks can be filled with the town water as well as with the treated sea water, so that if there were not enough of the latter produced, the cottagers would not be without a supply for flushing purposes.

It would indeed be well worth while to cease using the electrolysed sea water for a time, and to see what would be the effect of sending through the temporary system—(1) sea water, and (2) town water—for a period of seven days each. No further arrangements would be required, and it would be interesting to note what difference would be met with when the three methods were compared.

There is a difference in the arrangement in the two Yards B and C.

In Yard B there are two new water closets erected, each provided with a short hopper basin and trap delivering into a short and partly open drain, which leads directly to the syphon. Each closet has a flushing tank which holds from two to three gallons, and which is supplied directly from the store tanks in Yard A. No storm water, nor subsoil water, nor any dirty house water can pass down this drain, and the syphon only receives such material, liquid or solid, which has passed through the closets. There is, however, a tap in this yard, which is supplied from the store tanks, and whence water can flow at once into the temporary drain, and so into the syphon without going through the closets.

The syphon in Yard B acts as an intercepting trap whereby anything smaller than the meshes of the cage can pass away into the sewer. It is clear that since any solid matters are, as a rule, broken up on or before their arrival at the syphon, they will pass on at once to the sewer with each successive flush, or whenever there is a current of water issuing from the tap. After a closet has been in use, the next flush will allow a certain amount of fresh fluid to enter at the top of the syphon, which will then cause a similar amount of the contents to be displaced and flow forward towards the sewer. If this process be repeated a few times, without any more excreta passing from the closets, the original fluid will be all driven forwards, and the syphon will then be full of water only. It matters not how often these closets are used, for if after such use sufficient clean water passes down the drain, the syphon will soon be filled with this clean water, and any samples taken from the small drum beyond the syphon bend will be samples of clear water only; and if the electrolysed fluid be used, the samples will be those of electrolysed fluid only. The only solid matter left in the cage will be portions of papers which are too large to pass through the perforated holes of the cage. At certain times there must be some solid matter, and then the effluent is more or less tinted.

The case is different with regard to the arrangements in Yard C. Here not only the closets but the dirty house water from 14 cottages, as well as the treated sewage from Yard B, is constantly passing into the syphon. There is also a considerable amount of storm water, which flows from the roofs and yards of the houses when there is wet weather. The amount of sewage will be very small at night time, but during working hours, and especially on washing days, a large amount of dirty water must constantly be running from the houses away to the sewer. One can tell roughly the nature of the fluid by its appearance before it enters the syphon; sometimes it is clear and almost free from house refuse, as when there is a rainfall, and the closets and house drains do not happen to be in use. At other times the fluid has the usual appearance of ordinary liquid house refuse. There is no separate tap here by which a quantity of water can be sent down from the store tanks; each closet is supplied by a flushing tank, which is fed from the store tanks.

Nevertheless, the town water being laid on to the interior of each house, the water from the sinks and the water used for washing and cooking is free from the disinfecting fluid until it enters the drains.

Any sample taken from the small drum in Yard C during working hours will be sure to contain some sewage of greater or less strength.

Any samples taken from the small drum or the cylinder in Yard C will furnish a better proof of the efficacy of the Hermite process than samples taken in Yard B, where it is possible that nothing else than the disinfecting fluid may be drawn.

When 20 oz. of fresh excreta—*i.e.*, 4 oz. solid and 16 oz. liquid—were placed in a gallon of Hermite solution there was no bleaching, and no breaking up, nor destruction of the solid matter; the only effect was to conceal the odour of the contents, and to delay decomposition. When to 20 oz. of this treated mixture three times the

amount, or 60 oz., of Hermite solution were added, there was still no bleaching nor decomposition, but simply dilution of the original mixture, and the contents were partly deodorised. The Hermite solution used was of the strength indicated by 0·61 grams of chlorine per litre. Dilution with sea water only produced results similar to those met with when the electrolysed fluid was used; but in the latter case the colour was not so intense.

Both fluids prevented the decomposition of the excreta, and the Hermite solution produced in addition a small amount of bleaching effect.

When the proportion of excreta was 1 in 32 of the Hermite solution, its presence was easily detected; but when a solution of chlorinated lime of similar strength was used better results were obtained, and there was complete discoloration.

When strong chlorinated lime solution was tried, the contents were decomposed with evolution of froth; the fluid was bleached, and the liquid soon separated, on standing, into a clear portion and an abundant white flocculent deposit. The change with the Hermite solution was one of dilution chiefly, and not decomposition; the resulting fluid never became clear, and there was no white flocculent precipitate. With weaker solutions obtained from the process, the results were much the same as when sea water only was used.

When dirty house water was taken from Yard C, after passing through the syphon, it was nearly as foul as before entering, but any solid matters were, of course, retained, when they were not small enough to pass through the holes in the cage; the perforated cage on the house side of the syphon acted simply as a coarse strainer.

When to this treated effluent varying portions of Hermite solutions were added, the chief effect again was one of dilution only, and there was but little trace of any bleaching action. In the proportion of one of this sewage to ten of the disinfecting fluid the resultant was still foul. Strong chlorinated solution at once produced decomposition, followed by clearing up of the fluid and abundant flocculent precipitate.

I have tried several experiments with a view to see what effect the electrolysed fluid would have when various materials were exposed to its action for several days or weeks. To make a proper comparison three sets of bottles—each holding one pint—were filled with different liquids.

In series A, ordinary sea water was used, the water being allowed to stand for a few hours so as to allow of any sand or suspended matters to settle, and then the clear liquid was poured into each bottle.

In series B, a saturated solution of chlorinated lime was taken, and after subsidence the clear fluid was used to fill each bottle.

In series C, a similar set of bottles was filled with freshly prepared electrolysed liquid of known strength.

It was necessary to make these three sets of experiments, so as to see what action was due to the sea water acting alone, and what was due to it after it had been treated. Since chlorinated lime water is analagous in composition to the electrolysed water, it was used to see what action it would have on the ordinary substances used in sanitary apparatus. Although very much stronger in its action than any Hermite solution, it served as a guide to point out what materials would be most affected, or what substances would resist attack.

It is clear that if the stronger solution did not affect any articles which were placed in it, and which were exposed to its action for many weeks, it might fairly be assumed that they would still more easily resist the disinfecting fluid.

If, on the other hand, any articles were injured or corroded by the chlorinated lime water, it would be equally fair to assume that the Hermite solution would act in a similar but less severe manner.

The amount of harm done would, in a given time, be of course greater when the strong solution were employed, but the injury done would be chiefly a matter of time. A substance exposed to the action of the electrolysed fluid for several months might be as much injured as one exposed to the lime solution for a few days.

All the experiments were carried on under similar conditions, but all the solutions were in a state of rest. In this point they differed from what would occurr in actual practice where the fluid is constantly changing, and any rust or corroded particles could be carried away in the current and escape notice.

To allow for this loss, the bottles at intervals of a week were partly emptied, any clear fluid was poured off, and they were refilled from the original solutions or from solutions of a precisely similar nature freshly obtained.

On mortar, neat cement, cement, clay, paper, india-rubber, insertion (2 ply), and leather the three fluids had no effect. On metallic bodies, as iron and copper, the effect was very marked, but lead, zinc, and tin showed no appreciable difference.

Since iron was the metal most liable to injury, a further trial was made. Three short pieces of one-inch black iron pipe and three short pieces of one-inch galvanised iron pipe were taken, and each piece was separately marked and carefully weighed.

Four pieces (two of each kind) were then placed in chlorinated lime solution and electrolysed fluid, and the remaining two pieces (one of each kind) were set aside for comparison.

The four pieces were kept in the solutions in

four separate bottles for nineteen days, when they were taken out, dried and re-weighed.

	CHLORINATED LIME SOLUTION	HERMITE SOLUTION.
	MARKED IV.	MARKED V.
Black iron 1 in. pipe.	Original weight = 93·5374 grams. Final weight = 89·9084 grams. Loss = 3·6290 grams, or 56 grains.	Original weight = 97·7494 grams. Final weight = 97·2310 grams. Loss = ·5184 grams, or 8 grains.
	MARKED I.	MARKED II.
Galvanised iron 1 in. pipe.	Original weight = 87·2517 grams. Final weight = 81·3647 grams. Loss = 5·8870 grams, or 91 grains.	Original weight = 94·1207 grams. Final weight = 94·1855 grams. Gain = ·0648 gram, or 1 grain.

The slight gain in the last case was due to a little white deposit which adhered strongly to the surface of the galvanised iron.

I have not gone into the question of cost, as that is a matter for engineers; nor into the question of trying the process on sewage when it has passed into the sewers, nor upon sewage at the outfall, since the present experiments have only been applied to houses.

Besides the annual cost of producing sufficient fluid, there would be a very great outlay in putting down a fresh set of mains, pipes, and cisterns, so as to convey it to each house.

Moreover, each house, or each group of small houses, would require to be furnished with a syphon.

In addition, I give the results which have been obtained from chemical and bacteriological analysis. The samples were taken on the day when M. Hermite explained his system on his recent visit to the town.

Chemical Analysis.

Three samples, collected on February 26th, 1894, were sent to Dr. Dupré, F.R.S., of Westminster Hospital. They were from the following sources:—

I. M. Hermite's solution, taken in Yard A.

II. Sea water.

III. Sewage effluent in Yard C, after treatment with the electrolysed fluid.

Each sample was sent in a Winchester quart bottle, sealed and stoppered. Dr. Dupré, in his report dated March 9th, 1894, states as follows:—

I. M. Hermite's Solution.—The water contains a small proportion of hypochlorite, probably magnesium or sodium, equal in effect to 0·72 grams of chlorine per litre, or of 50·4 grains per imperial gallon. The sample contained 1.315 grains of combined chlorine, equal to 2,167 grains of chloride of sodium per gallon.

II. Sea Water.—The sample of untreated sea water sent contains no hypochlorite or free chlorine, and 1,315 grains of combined chlorine per gallon, which is about the normal amount in pure sea water.

III. Sewage.—The sewage is of dark brown colour and very turbid; it has no offensive sewage smell, but has a somewhat disagreeable beery smell. It still contains a small amount of hypo-chlorite. The amount of oxygen absorbed is extremely high, about four times as much as in the case of ordinary London sewage. The proportion of free ammonia is low for a sewage, but this may, however, be due to its being fresh. The amount of albumenoid ammonia yielded is extremely high. The sample of sewage is evidently of somewhat abnormal character, and does not seem very well suited for experimental purposes. Without a direct comparison between the treated and untreated sewage, it is impossible to say what improvement the treatment has effected.

I may say, however, that this sample does not smell like ordinary sewage, and has not developed an offensive sewage smell after a week's keeping.

Judging from the amount of combined chlorine present, compared with that of sea water, either a far smaller proportion of sea water has been used for flushing than water in the case of ordinary water closets, or else the sewage is otherwise mixed with much water.

Analytical Details.

Appearance	Turbid, filthy-looking.
Colour	Dark brown.
Smell	Not offensive, but somewhat beery smell.
Deposit	Much foul.
Nitrous acid	——
Phosphoric acid	——
Oxygen absorbed from permanganate	20·3 grains per gallon.
Total dry residue	1,264·0 grains per gallon.
Colour of ,,	Dark brown.
Behaviour of residue on ignition	Much charring, evolves slight smell of urine and nitrogenous matter, also that of residue from beer.
Chlorine	538·0 grains per gallon.
Ammonia	·931 grains per gallon.
Albumenoid ammonia	2·45 grains per gallon.
Hypochlorite equal to free chlorine	0·026 grains per gallon.

Bacteriological Analysis.

Three samples, collected on February 26th, 1894, were sent to Dr. Klein, F.R.S., of St. Bartholomew's Hospital; they were from the following sources:—

A. Sewage effluent in Yard C, after treatment with the electrolysed fluid.

B. Sea water.

C. M. Hermite's solution taken in Yard A.

Each sample was sent in a Winchester quart bottle, sealed and stoppered.

Dr. Klein, in his report dated March 5th, 1894, states that—

Sample A was a very turbid fluid, with a large amount of flocculer matter suspended in it; it had no offensive smell.

Sample C was clear, and had a strong chlorine smell.

Cultivations were at once made from the three samples:—

Sample A.—(1) One plate was made with 1·0 c.c., and one plate with 0·1 c.c. of the fluid; (2) 500 c.c. were driven through a Berkefeld filter.

This fluid took, owing to the very large amount of solid matter suspended in it, nearly an hour to pass through the filter; the same quantity of water would, as a rule, take about ten minutes.

The particulate matter of the outside of the filter was then brushed off, suspended in 10 c.c. of sterile water, and with 1 c.c. of this each of two gelatine tubes were charged and used for plate cultivation.

Result: In both the plates of series 1 (*i.e.*, charged with 0·1 and 1·0 c.c. of original fluid A) numbers of colonies of bacteria developed; an estimation of their number showed that fluid A contained per 1 c.c. between 800 and 1,000 living microbes. From the various colonies of these plates the following species have been isolated: (*a*) Bacillus coli, very numerous, (*b*) bacillus subtillus, (*c*) proteus vulgaris, (*d*) bacillus ulna, (*e*) bacillus mesentericus, (*f*) a non motile cylindrical bacillus, not liquefying, (*g*) various species of cocci. It follows from this that of the species that developed, several are such as do not form spores—*e.g.*, bacillus coli, proteus vulgaris, and the several species of cocci.

In the plates of series 2 (that is, those which each received the solid matter of 50 c.c. of the original fluid) the number of colonies that came up in 48 hours was so great, and the liquefaction so extensive, that they were practically useless for counting them or determining their character.

Now this sample A, as far as I understand the description given on the label and in your letter, was sewage that had been subjected to the treatment after M. Hermite's process. Ordinary raw sewage of London, Manchester, and other towns that I have examined, contains between three millions and ten millions of bacteria per 1 c.c.; this "treated" sewage effluent of Worthing, as stated above, contains only 800 to 1 000 microbes per 1 c.c.; it follows that there has been effected by the admixture of the Hermite solution a remarkable reduction in the number of living microbes, but it also follows that nothing like sterilisation has been produced, since a considerable number of bacteria have survived the process; and be it also noted that amongst those that survived are several species that do not form spores, so that an assertion to the effect that the highly resisting spores are not killed, whereas non-sporing bacilli are killed by the process, is not borne out by these observations.

A further experiment was made with this sample A on March 3rd, *i.e.*, after it had been kept four days. With ¼ c.c. of the fluid A, a gelatine plate was made and the result watched. On the third and fourth day the number of colonies were counted, and as a result it was found that their number had increased meanwhile more than fourfold. Cultivations made after six days keeping showed that the number of microbes had meanwhile increased more than one hundredfold.

Sample B. A plate was made with 1 c.c. of this sea water. The number of colonies that came up was too great to be counted; in fact, the gelatine was densely pervaded by colonies. A plate was made with 0·01 c.c. of the water, having been kept two days. The number of colonies was estimated to be 1,000 per 1 c.c.

Sample C was treated in the same manner as sample A. Result: The fluid proved sterile, only two colonies were noticed in one plate made with the particulate matter of 100 c.c. of the sample; the companion plate was free of any growth.

Now, this result is extremely interesting, for it proves that sea water, containing a very large number of living microbes (sample B), becomes practically sterilised by the Hermite process (sample C).

In order to ascertain further whether cultures of non-sporing bacilli, when mixed with Hermite's solution become sterilised thereby, I made the following experiments; but I should repeat here that I had no great hopes after the results obtained with sample A, for we have seen this sample was not anything like sterile, still containing 800 to 1,000 microbes per 1 c.c.

Broth culture of (1) Bacillus coli, (2) bacillus of typhoid, and (3) cholera vibrios, were mixed each with the same bulk of Hermite solution (C), and after thoroughly shaking were left standing for 20 minutes, and from them sub-cultures were made in normal nutritive media; in broth and in gelatine, each culture tube receiving one drop of the mixture. The result was this: All sub-cultures in broth showed growth, the broth cultures were uniformly turbid in 24 hours incubated at 37° C.; the gelatine tubes of the bacillus coli and the cholera vibrio incubated at 20° C., showed numerous colonies after 48 hours, those of the typhoid developed a small number of colonies after four days. This is quite in harmony with the experience repeatedly made, viz, after allowing the disinfectant to act on the microbes, it is necessary to expose the sub-cultures made from the "treated" material to 37° C., in order to avoid a hasty conclusion; repeatedly it has been found that while sub-cultures exposed to 20° C. failed to give a positive result in two days, those exposed to 37° C. yielded good growth. The growth which appeared in these different sub-cultures in broth was tested by further sub cultures, and thereby it was ascertained that the same microbes that were used for the initial experiment were recovered in their perfectly normal characters. There is one point in connection with this series of experiments which is of importance, and this is —that by the addition of the same bulk of Hermite solution to the original normal cultures, the number of living microbes had decidedly become reduced, although a good many living examples were still left. This was determined in the following manner: From the original normal cultures 1, 2, and 3, a definite quantity was withdrawn mixed with the same bulk of sterile salt solution, and from this mixture plates in Agar were made and incubated at 37° C., in order to determine the number of microbes per 1 c.c. After the treatment of the original cultures with the same bulk of Hermite solution for twenty minutes, similar plates were made, and the number of colonies coming up in these plates was compared with those of the previous control plates. It was found that by the Hermite solution the number of living microbes was reduced something like over one hundred times.

A further experiment was made with these broth cultures of colon, typhoid, and cholera, to which an equal bulk of Hermite solution had been added. It was this: After keeping the mixture for twenty-four hours, inoculation was made into fresh sterile broth, each tube receiving about five drops of the "treated" culture. The result was interesting: the bacillus coli and cholera vibrio yielded normal growth, the typhoid did not yield any growth. So that even after twenty-four hours' exposure of broth culture of bacillus coli and of cholera vibrio to an equal bulk of Hermite's solution, each five drops of the coli fluid and the cholera fluid still contained living microbes, while the typhoid fluid appeared sterile.

Now, it is maintained by the "Hermite system," as explained in the printed leaflet which you kindly sent me, that "fæcal matter is instantaneously destroyed (meaning, of course, sterilised) when mixed with the electrolysed disinfecting liquid." The above experiments show that this was not the case with the sewage operated upon at Worthing, nor was it the case when cultures of bacillus coli, bacillus of typhoid, or of cholera vibrio were subjected to the liquid. I do not know what is the proportion of Hermite solution that this "Hermite system" recommends to be added to "fæcal matter" in order to sterilise it, but it must be quite clear from the above experiments on the broth cultures that even an equal bulk of Hermite solution added to the cultures does not by any means sterilise them even after 20 minutes' exposure, and some not even after 24 hours. Whether such an addition (*i.e.*, equal bulk) in regard to sewage is possible in practice, is a matter on which I do not wish to give an opinion, but anything equal or *à fortiori* anything less, would for sterilisation purposes be vain. Of an "instantaneous" action there is nothing to be noticed in the above experiments.

Since there is no instantaneous decomposition of fæcal matter, and no sterilisation of sewage, I am of opinion that the process, as far as the late trials have gone, has therefore failed to produce the results which are claimed for it by its inventor.

ON INTERCEPTING TRAPS AND WATER-TIGHT DRAINS.*

By T. De Courcy Meade, M.Inst.C.E., Engineer and Surveyor to the Hornsey Local Board.

Intercepting Traps.—It is thought by some that there is no difference between the gases generated in sewers and those to be found in properly constructed and disconnected drains, and I am free to admit that I accepted this erroneous view as correct, until certain difficulties in connection with sewer and drain ventilation induced me to give special attention to the subject. Without entering into particulars of the experiments which I made when investigating the matter, I would like to point out that when a drain is properly constructed and properly worked, all sewage entering it passes away to the sewer within the space of a few minutes, and, consequently, there is no time for it to decompose in the drain. Any gases given off from matter adhering to the interior of the drain are constantly diluted by the current of air passing through it, and are discharged into the atmosphere, above the level of the house, in an inoffensive state. In a system of sewers there is, however, quite a different state of things; each local sewer receives in eight hours the bulk of the sewage which passes through it every 24 hours, and during the remaining 16 hours the flow is, as a rule, very small indeed—frequently but a mere dribble—and quite insufficient to render the sewer self cleansing for the time being. During this period sewer gases are largely generated, and where intercepting traps are not used, much of this foul sewer air is forced into the drains when the sewage rises in the sewers. I find that even under favourable conditions the velocity of the air in sewers is much less than usually found in properly made drains; consequently the air of sewers, although more impure, is diluted by fresh air to a much smaller extent, and, therefore, should be removed, as far as practicable, from the dwelling.

Looking at this question from a purely official point of view, one might perhaps be tempted to favour the discontinuance of intercepting traps for the purpose of assisting the ventilation of the public sewers; but, from experience gained after years of careful investigation of sewer ventilation and drainage, I feel that I cannot advise a course which I consider fraught with danger to the inhabitants, more especially to those who occupy small class property, where the fittings are generally of a cheap and unreliable description. In districts of a semi-rural character, where there is plenty of open space surrounding each dwelling, and where all drains are kept outside the external walls, the danger of converting house drains into sewer ventilators may be lessened if special care is taken in fixing the ventilating pipe and maintaining it in an air-tight condition.

The drains of a considerable number of old houses in the district have been examined by your inspectors, and reported upon during the past twelve months, and several cases have come under my observation where, on the application of the smoke test to the drains of one house, in a street where there were no intercepting traps, the smoke passed into the sewer, and from thence into the drains of neighbouring houses, and, through faulty joints or fittings, into the living rooms. In each of these cases the occupiers were persons of the working class, to whom loss of health usually means loss of livelihood.

Drain Testing.—With ordinary care there is no reason why all drains should not be laid in such a manner as to be perfectly water-tight, not only at the time they are laid, but also after they have been covered in and the building completed. Drains properly constructed will remain in a perfectly water-tight condition. I have had opportunities of testing the drains of houses which had been laid many years previously, and I found them perfectly water-tight. It is of little use to test sections of a drain before it is covered in, and to omit the final test of the finished drain on the completion of the building. The weak points are generally found in the branch drains, which, in practice, cannot easily be completed until the building is well advanced; and it frequently happens that carelessness in filling and ramming the trench over the drain is a cause of subsequent failure.

Drainage work used formerly to be sub-let to a labourer, and this custom still prevails in some cases, although it cannot be expected that drains laid by piece-work should continue water-tight.

Many persons think that the concrete which surrounds the drain beneath a building is sufficient to make it water-tight, even assuming that there are leaking joints. This, however, is a mistake, the object of the concrete being to afford a rigid foundation and bed for the pipe, and for its protection generally, and not for the purpose of making it water-tight.

I have seen leaky drains taken out of old buildings where concrete had been used, and it was only necessary to observe the filthy condition of the concrete and the ground adjoining to have forcibly impressed upon the mind the necessity of laying all drains with perfectly water-tight joints.

The subsoil of the greater part of the district of Hornsey is clay, and this, contrary to what is sometimes thought, is one of the most treacherous materials with which a drain trench can be filled. It is difficult to thoroughly consolidate the clay without risk of damaging the drain, and, even where the greatest care is used, cracks will almost invariably appear in the clay filling, as it becomes dry and shrinks, where protected from moisture by

*From a special report to the Hornsey Local Board. See also remarks in last month's PUBLIC HEALTH (p. 234).

the dwelling-house. These cracks afford a free escape for the gases from a defective drain into the building, and even the concrete with which the surface of the building is covered is not proof against their egress.

The smoke test, although convenient for testing traps and fittings above ground, is of no value in testing underground pipes. A drain may be leaking at every point, and yet appear perfectly sound on the application of the smoke test.

There are many inventions for making the joints of stoneware pipes water-tight, but as some of them are at present monopolies, I refrain from alluding to them. I will, therefore, merely mention the "Stanford" form of joint which any builder can easily make on the ground or can obtain ready made from the manufacturers. The composition used in Stanford's joint is composed of one part of boiled tar, one part of clean sharp sand, and one part and a half of sulphur. The sulphur may be increased to one part and three-quarters if it is desired to make the joints harder for the purpose of carriage, etc.

Some builders in the districts are now using iron pipes in lieu of stoneware. These pipes have the advantage of fewer joints, but should be well coated with Dr. Angus Smith's or other solution to prevent oxidation by contact with the sewage, and the joints should be run with lead.

The information which I have obtained from the borough engineers and surveyors of many of the principal health resorts, and from the surveyors of some of the London vestries and the surrounding districts outside the metropolis shows that there is, with one or two exceptions, a very general consensus of opinion in favour of the use of intercepting traps, and of the necessity for water-tight drains.

Carriage of Diphtheria Infection by Clothing?—In the following case the infection of diphtheria appears to have been conveyed by clothing. On May 9th a child who had been visiting at Stratford was sent home to Writtle on account of a child in the house being attacked with croup. On the 16th the child who had returned home was attacked with diphtheritic croup and died on the 22nd, and the house was afterwards repapered, limewashed, and disinfected with sulphur. On the 20th its brother was sent to Roxwell to his grandparents, and he remained there enjoying good health until July 1st, when he was attacked with diphtheria. On June 25th it appears some clothes which had been in the room in which the younger child died were sent to Roxwell and worn by the patient, and this seemed the only possible way in which the child could have become infected.*—*From Dr. Thresh's Annual Report to the Chelmsford R.S.A.*

* For particulars of a case of diphtheria arising from infected rags after nine years, see Public Health, Vol. V., p. 271.

THE PROBLEM OF HOUSING OF THE WORKING CLASSES IN RURAL DISTRICTS.*

By George Turner, M.B, D.P.H. Camb.,
M.O.H. Herts Combined Districts.

It appears a simple matter to condemn a house as unfit for human habitation and cause it to be closed. But it must be remembered that there are a certain number of persons in the district who must be housed, and must be housed too within a reasonable distance of their work, and that a cottage pulled down or closed is not necessarily rebuilt or repaired and made fit for habitation, because the rent which an agricultural labourer can afford to pay does not make the erection of houses, such as would in these days be considered fit to live in, remunerative as a speculation.

Cottages in the Hertford rural sanitary district, broadly speaking, are owned by two classes of people, viz., landowners who have built cottages for the convenience of their tenant farmers, and small owners who have invested their savings in cottage property as a source of income or perhaps as a provision for old age.

Generally little trouble is experienced in dealing with the first class. Most of the new cottages on the large estates are fit for anyone to live in, and, I should say, can yield little or no direct profit. Even when complaints are made with regard to the older cottages the complaints are usually attended to.

With the second class matters are far different; the owners naturally expect to make money out of the buildings, which when originally bought were probably already far gone in ruin and on which little is spent in repairs.

During the past twelve months I have made house to house inspections of the district.

The defects most usually discovered and reported were: General dilapidation due to age, rendering the cottage damp and unhealthy; privies placed either against the house or too near to it; newly-erected houses badly built; bad or deficient supply of water.

Sometimes the defects were such as to render the house unfit for human habitation without the possibility of any improvement short of demolition and reconstruction; in other instances the cottages could be made habitable at a comparatively small cost, and the cases have been dealt with accordingly.

In the Watton division of the Hertford Rural Sanitary District 22 houses were declared unfit for human habitation. Notices have in all cases been served on the owners, and the inspector's report states that: 4 houses were closed, 4 repaired, 2 partly repaired, 4 in hand, 5 the owners were waiting to make

* From a special report to the Hertford R.S.A.

terms with an adjoining landowner for additional land, 1 occupant waiting to find a new house, 2 nothing done. At the first glance it would be supposed that the notices had been attended with complete success in 36·4 per cent. of the cases, 27·2 per cent. had been partly successful, and in only 9 per cent. had entirely failed. In my opinion, however, this would give far too favourable an impression of the facts.

The four houses which have been closed will, probably after a longer or shorter interval, be quietly re-opened. The repairs, except in two cases, are equally certainly of the most flimsy description. The houses "in hand" will very likely remain "in hand" until they fall down; I have known this process extend itself over many years. As to the other items, the only one in which I have complete confidence is the one which declares that absolutely nothing has been done.

Certainly it is not probable that owners will be over-ready to obey the notices of the sanitary authority, while it is publicly demonstated that it is far cheaper to disregard the notices than to comply with them.

In February, 1893, I was asked by the inspector, Mr. Scales, to inspect ten houses at Brickendon, in the Hertford district. I did so, and reported to the Board that they were unfit for human habitation. The owner, a member of the Board, disputed the fact, but the sanitary authority eventually decided to prosecute him.

The case was heard by the magistrates at Hertford on July 1st, and they were assured by Dr. Thresh, Mr. Urban Smith, C.E., Mr. Scales, the Sanitary Inspector, and myself that these cottages were in no way weather proof, that we could see the light through the boarded ceilings and the slate roofs of all of them, and that in most we could see through the walls into the adjoining cottages or into the open air, and that they were so badly constructed as to be unfit for human habitation.

This evidence with regard to the roofs was contradicted by witnesses on the other side, whose evidence on this head I am quite prepared to believe, as applied to the time at which their inspection was made. But even these men admitted, under cross-examination, that the style of building was unusual—"lightly built" was the expression used.

The magistrates visited the houses and allowed the defendant five weeks, until August 5th, "with a view to giving the defendant an opportunity of carrying out those repairs,substantial and otherwise, which they (the magistrates) deemed to be necessary."

Eventually the time allowed was extended to August 19th. On that date the magistrates again inspected the cottages. The boarded ceilings upstairs had been covered with mortar spread upon the upper side. Some mortar had been inserted between the boards of the walls, and one or two of the larger holes between the cottages had been blocked with mortar or cement placed upon and between the woodwork. The magistrates saw the cracks which let in the light from outside and the holes between the cottages.

Upon returning to the Bench the Chairman said: "Since we last met certain alterations and repairs have no doubt been made, but the Bench deem these nevertheless insufficient, and before I say anything further I should like to know whether certain things that the magistrates deem imperative should be done, will be done. One of these requirements is that the matchboarding should be taken off one side of the party walls and replaced with plaster and hair, and where the daylight shows through the frames of the windows and doors a small fillet should be fixed over the aperture to prevent the draught."

This the defendant's solicitor, on behalf of his client, undertook should be done.

The Chairman then gave the decision of the Court as follows: "Under the circumstances we have come to the determination to dismiss the case, but we do not wish it to be imagined for a moment that we express anything but a favourable opinion as to the conduct of the sanitary authority. We make no order as to costs, and therefore the Court fees will be paid in equal moieties."

With all due respect to the Bench, and while I fully appreciate the great difficulties the case must have presented to the magistrates, because any other decision simply meant turning about 50 people out of house and home and moving them away from their work, I must say I regret that decision, especially as regards the costs.

The trial flung an expense of about £27 upon the rates. The offender was a member of the body charged with the care of the public health, and therefore doubly bound to comply with the requirements of the sanitary authority. He was a builder, and must have known he was entirely in the wrong.

Are the owners of small cottage property, who are often ignorant persons more deserving of pity than blame, likely to comply with what must seem to them the unjust and oppressive requirements of the sanitary authority, when they see that compliance must necessarily diminish, if not do away with their profits, while resistance, even in case of failure, will entail no punishment, and that a heavy cost being imposed upon the ratepayers the sanitary authority will not be very ready to take action?

I have visited these cottages, and have to report that the promise made to the magistrates, upon the faith of which the summons was dismissed, has not at present been fulfilled, and I must ask the sanitary authority to again take the matter before the Bench.

The Board ordered that the owner should again

be prosecuted, whereupon he promised the work required should be done. This was on February 3rd, 1894; he was also to inform the medical officer when the work was completed, that it might be inspected. In the middle of March he was asked if the alterations were finished, and he replied not nearly. The medical officer of health reported the matter to the Board, April 7th, and asked that a limit might be fixed. The owner then asserted the work was finished, and a report will be made May 6th.

THE PARISIAN CHOLERA EPIDEMIC.

Several interesting reports have recently been published on the cholera epidemic around Paris in 1892. A full and detailed account by MM. Thoinot and Dubief is published in the "Revue d'Hygiène" for February. An attempt is made to trace the epidemic to its original starting points; but no conclusive evidence is brought forward to settle the question whether cholera was imported from a distance or arose as a local recrudescence. The most interesting part of the report is that which bears upon the influence of water supply in fostering the epidemic. The towns and villages around Paris are divisible into four or five groups according to the source of their water supply. One group to the north west of Paris, including the towns of St. Denis and Argenteuil, is supplied in large part with water from a highly polluted bend of the Seine, below the outfall of the Parisian main sewer. Another group to the west of Paris draws its water supply from higher up the stream, but still after it has been polluted by the refuse from Parisian streets. A third group is supplied with water from the Marne, and a fourth with a much purer water from the Seine above Paris. An insignificant number of communes obtain their water supply from the Oise, or from independent wells. In the first and second groups not a single commune escaped the epidemic; in the third 12 communes out of 22, or 54 per cent., were attacked; in the fourth, 13 out of 29, or 45 per cent. Or stating the deaths per 10,000 inhabitants, there were 36·4 and 15·6 in the first and second groups, 5·1 in the third, 2·7 in the fourth. It is also noticeable that the earliest cases occurred in the district with most polluted water supply, while the districts supplied from the Marne and the upper part of the Seine were attacked late in the epidemic. In the fourth district there were no cases in communes at a distance from Paris. The places supplied from the Oise and from deep wells almost entirely escaped. The figures would probably have been more striking but for the fact that the district with most polluted water supply was also partly supplied from purer sources.

The report by M. Dupuy in the "Progrès Médical" on the St. Denis portion of the epidemic leads to very similar conclusions. The earliest cases appeared in outlying districts with a poverty-stricken and often intemperate population, and from these the epidemic radiated towards the centre of the town. The early cases were almost invariably associated with the use of polluted water, others originating from these by infection of linen and other articles. As already stated, the water supply of St. Denis is derived partly from a highly polluted bend of the Seine, partly from wells. Some of these are deep artesian wells which supply a very pure water, others tap a middle stratum yielding a very hard water scarcely fit for drinking, while yet others are superficial wells in strata liable to contamination from the Seine or the canal of St. Denis. Of 138 cases investigated, 80 used water from polluted and 30 from doubtful sources, and of the rest there were only 4 in whom the attack could not be traced to some other recognised cause of infection. Some were referred to the use of salads or vegetables washed with impure water or of cheap wines adulterated with water. There was no immunity among copper workers. Two cases in pregnant women both recovered without mishap. There were no cases of transmission to the attendants in the isolation wards of the hospital, although cases of infection from the sick were not wanting in the town itself. The death-rate in this local epidemic was somewhat lower than that in other parts around Paris, notwithstanding the exceptionally heavy incidence of the disease on the district, a result attributed to the careful sanitary precautions taken in the hospital.

M. Dupuy is no believer in the Eastern origin of modern cholera epidemics in France. He points to the investigations of Sanarelli ("Ann. de l'Inst. Pasteur") in support of the view that the comma vibrio has become naturalized in the water of Parisian suburban sewers, thence to spread to the capital whenever suitable conditions are present.

Gloves and Infection.—Dr. Barnes, M.O.H. for the Chard U.S.D., draws attention in his annual report to a subject which some years ago was mentioned in these columns by Dr. Swete. Dr. Barnes says, "In my opinion gloves are a common source of scarlet fever infection. When medical officer of health for the Chard Rural Sanitary Authority an outbreak occurred at Shepton Beauchamp, and I saw several girls making gloves whilst their hands were peeling. The soft rough inside of a glove is a suitable substance to rub off and retain the loose particles of skin. Many persons have a habit—a bad one—of breathing into new gloves just prior to putting them on; and as the throat is the part which is first attacked, it follows that a gentleman presenting a lady with a dozen pairs of best kids may at the same time be presenting her with an alarming, if not fatal, disease."

RECENT RESEARCH.

On the Purification of Sewage by Subsidence.

Hühner has investigated at Halle the effect of simple subsidence. He gives an interesting and elaborate description of the University buildings and the sewerage thereof. The authorities forbid the direct introduction of the hospital discharges into the town sewers as being highly dangerous to the community. The sewage of the University, etc., passes into two large basins, where the suspended material is allowed to deposit and floating substances removed, the fluid contents passing on without hindrance. The closets and drains are purified by Friedreich's disinfectant, consisting of 10 per cent. carbolic, 35 quicklime, 15 hydrate of iron, and 3 per cent. alumina. This prevents the development of germs and the evolution of noxious gases. As a result of these experiments, he found that 94 per cent. of the solids are removed before entering the town sewers. (Hühner, "Archiv. für Hygiene," Vol. xviii.)

An Easy Method of Sterilising Water.

Moritz Traube recommends a solution of chloride of lime. He finds that a solution containing 0·000426 gramme, when added to 100 c.c. water containing bacteria in large amount, destroyed all in about two hours. The water was shown to be free from germs by means of suitable nutritive media, as Koch's bouillon. After two hours the chlorine was only diminished to the extent of 9 per cent. In order to remove the excess of chloride of lime, the addition of 0·0202 gramme sodium sulphite was sufficient. An excess of the latter substance is not of much consequence, inasmuch as it is converted into sodium sulphate after the lapse of a few hours. By the addition of these two compounds the hardness is only increased 0·7 degrees (German). One million cubic metres of water require 85 cwt. of chloride of lime and 40 cwt. of the sulphite.

It is interesting to note that the organic matter of the sterilised water was practically the same after the action of the chloride of lime. It seems, therefore, that the chlorine acts chiefly on the microbes. Traube made no experiments on pathogenic microbes, but from the researches of Koch and of Nissen ("Zeitschrift für Hygiene," Vol. viii., p. 62) it is probable that they are also destroyed. The author recommends this method for employment on the large scale as being cheap, feasible, and reliable. (Moritz Traube, "Zeitch. für Hyg.," Vol. xvi., Part 1, February, 1894.)

From a recent report by Dr. E. Klein, F.R.S., it appears that the addition of a few drops of Jeyes' fluid to an agar cultivation of the influenza bacillus produced sterilisation, while the presence of carbolic acid did not interfere with its growth.

THE FILTRATION OF WATER.*

By C. R. Macdonald, M.D., D.P.H.,
Medical Officer of Health for the County of Ayr.

It appears that the theory of the purification of water by filtration has of late undergone considerable modification. It has now been clearly demonstrated through the investigations of Koch, Frankland, and others that a new filter composed of perfectly purified sand has comparatively little effect in producing either chemical or bacteriological purification of water. This view certainly upsets all our preconceived ideas of the purification of water by passing it through sand and gravel. It has been shown experimentally that although a clean sand filter is unable to satisfactorily purify a water polluted with organic matter, yet in the course of use a layer charged with living microbes is deposited upon the surface, and it is by these organisms, which constantly increase in number, and also penetrate the sand to a slight distance, that both the nitrification of organic matter and the arrest of other microbes are effected. Thus, the longer a filter has been in use the more efficient it becomes, provided, of course, that the surface layer has not acquired such density as to interfere with the passage of the water. The frequent cleansing of the filter-beds as had been formerly thought to be the proper method, now appears to have been a mistake. The filtration of the London water supply is now carried out on the method recommended by Koch and Frankland, and the regularly conducted bacteriological examination of these waters by Dr. Frankland shows that when filtration is efficiently conducted 98 to 99 per cent., and sometimes even the whole of the microbes are removed from the samples examined.† We can thus see that by proper filtration a doubtful supply of water may be rendered almost absolutely safe. But as this artificial barrier to its pollution will be subject to break down at any moment, the wisdom of providing a water supply from a source which would render it independent of filtration must be apparent. Koch gives a very forcible illustration of the importance of filtration. He points out that both the towns of Hamburg and Altona in 1892 obtained their water supply from the Elbe, which caused the serious epidemic of cholera in Hamburg, while Altona escaped, although the former drew its water from the river above the town, where it was comparatively pure, while Altona took water lower down, where the river was very much fouler owing to its having received the drainage of Hamburg. Altona practically escaped the visitation of cholera, whereas Hamburg suffered severely. At the latter the water was delivered unfiltered, but at Altona it was carefully filtered. One group of workmen's houses in Hamburg was

* From Dr. Macdonald's Third Annual Report.

† Vide Report of the Royal Commission on the Water Supply of the Metropolis, London, 1893.

spared by the epidemic. This group, and this group alone, was supplied with water from the Altona supply.

The rate at which water is passed through the filters is an essential element in the filtering process. According to Koch, this ought never to exceed 100 millimetres (about 4 inches) an hour. The average rate of filtration by the London water companies is $1\frac{3}{4}$ gallons per square foot of filtering surface per hour. Koch expresses in very decided terms the opinion that the only trustworthy test of the efficiency of filters, and of the freedom of drinking water from disease causing qualities, is that afforded by the application of well-known bacteriological methods. "Filtration," he says, "is designed to remove particulate poisons, and chemical analysis, which deals only with soluble poisons, can give no information as to the efficiency of filtration."

THE POISON OF EXPIRED AIR.

Some years ago a remarkable series of experiments were published by the late M. Brown-Séquard, and M. d'Arsonval, which appeared to prove that respired air was poisonous from its organic matter rather than from the CO_2 contained in it. Their results being disputed, a new series of experiments were devised in a more convincing form, and the latest results are now published in *Archives de Physiologie.*

A series of cages for rabbits or guinea-pigs closed by water seals is so arranged that the air enters at one end and is drawn through each cage in turn. By an automatic arrangement the excreta and debris of food do not stay in the cages, but are discharged into trapped reservoirs outside. It was found that the animals died after an interval varying from less than a day to several months, according to the nature and concentration of the respiratory impurities; but that if these were passed through sulphuric acid, which arrested the organic matter without the CO_2, the animals seemed quite unaffected, even if kept repeatedly for many months in the cages. The degree of concentration of CO_2 in the end cages amounted to from 4 to 6 per cent. The symptoms produced were not those of asphyxia, but rather those of arrested respiratory changes in the tissues, increased pulse rate, diminished respiratory rate, and dyspnœa, the blood remaining red. Similar results follow the injection of respiratory impurities under the skin, but are more quickly produced. Merkel, in Germany, has repeated the experiments on mice, and arrived at the same conclusions, which are, moreover, supported by the experiments of Richardson and others. They help to explain the success of the "open-air treatment" of specific fevers and of phthisis and other diseases, and the evil effects of insufficient ventilation, in which something more noxious than CO_2 is evidently concerned. Some years ago some remarkable instances were published by Handfield-Jones in which hospital patients suffering from serious disease of a probably tubercular nature were cured by the "open-air treatment," and many other physicians have put on record cases of phthisis arrested by living out of doors day and night. Whereas in scarlatina or small-pox the virus is all important, in phthisis the state of tissue nutrition appears to have at least an equal influence on the result, and this is sure to be much affected by the organic poisons of the breath. M. Brown-Séquard stated in 1887 that guinea-pigs inoculated with tubercle escaped the disease if kept day and night in the open air, whereas they nearly always died if kept in the laboratory, where ventilation was less perfect. Making full allowance for possible experimental errors, it seems clear that if we wish to diminish the prevalence of tubercle we must act on this principle, and carry off respiratory impurities or forbid an indoor life. This is what indeed M. d'Arsonval has done in one of the French hospitals with the best results, and what has also been done in the French consumption hospitals recently described in our columns.

THE DIAGNOSIS OF TYPHUS FEVER.

Recent Outbreaks in Liverpool.*

By E. W. Hope, M.D., D.Sc.,
M.O.H. for the City and Port of Liverpool.

As long ago as September 26th last the wife of a plumber named Banks died at 9, Vipond Street, the cause of death stated to be pleurisy. On October 18th a member of her family was removed to hospital suffering from typhus fever; and on October 25th another person, named Devonport, living in the same house, was notified to be suffering from enteric fever, and she refused to go to the hospital. On November 3rd, however, four persons belonging to the Banks and Devonport families, together with the woman Devonport, were found all to be suffering from typhus fever, and they were removed to the Netherfield Road Hospital. The Banks family subsequently went to reside with a family named Coulson, living in 3 House, 12 Court, Hygeia Street; and on January 23rd Coulson, the father of the family, died. His death was certified to be from bronchitis, and the body was kept in the house about a week before burial. After Coulson's death his four children were taken by relatives, two going to No. 49, Annerley Street, one to No. 37, Job Street, and one to No. 37, Herbert Street. One of the two who went to Annerley Street was found to be ill on February 15th. It was removed to the hospital, and developed typhus fever. On February 24th the

* A report presented to the Health Committee, February 27th, 1894.

aunt and cousin of this patient were removed from 49, Annerley Street with typhus fever. With regard to Coulson's other child, who was taken to 37, Herbert Street, George Coulson, a brother, was sent into Mill Road Infirmary by a doctor suspected to be suffering from pneumonia. At the infirmary he was found to be suffering from typhus fever, and was sent on to Netherfield Road Hospital on February 20th. His house was visited on the same day, and three members of the family found to be sick, and those were at once removed to Netherfield Road Hospital, together with three other children, and a person who had been in attendance, the latter four being removed for isolation. Meanwhile, during the week ending February 24th, two persons have been sent by doctors to Mill Road Hospital from 12 Court, Hygeia Street, and on arrival there have been found to be suffering from typhus fever and sent on to Netherfield Road Hospital. Another case from 15A, Hygeia Street, was also sent as non-infectious to Mill Road, and subsequently transferred to the proper hospital at Netherfield Road.

In addition to the foregoing series, all of which are connected with one another, there is also the outbreak in Tuebrook, which contributed fourteen cases. In these instances also not only did the error in diagnosis delay the adoption of precautionary measures, but the real nature of the disease was denied long after it might have been expected to have declared itself.

A third series contributing fourteen cases apparently unconnected with the two foregoing has also been dealt with in Pritt Street, and in addition to this a number of scattered cases in Beatrice Street, Gordon Street, and neighbourhood have come to light, and these cases all appear to be unconnected. The usual precautions have been stringently observed, and a visit is paid every day to every house in which typhus fever has occurred to make inquiries for further sickness of the kind. It is an interesting fact that out of 25 cases of typhus fever removed to hospital during the week ending February 24th, not a single one was notified as typhus fever. Two were notified as typhoid fever, seven others were sent into the workhouse as suffering from various non-infectious ailments, and the remainder were traced by the staff of the Sanitary Department.

DISINFECTANTS.—Some experiments have been made by Lenti, of Naples, on the influence of alcohol, glycerine and oil respectively on certain disinfectants. It appears that pure alcohol or glycerine annihilate the bactericidal action of both corrosive sublimate and phenol, but that the disinfecting power returns on dilution with water. Phenol and lysol both appear to lose their antiseptic power when dissolved in olive oil.—*Lyon Méd.*

THE MILK SUPPLY AT PUBLIC INSTITUTIONS.

AT Newcastle-on-Tyne a series of samples of milk have been recently taken from the persons supplying several large public institutions in the city. The results of analysis showed the addition of 18, 36, 30, 22, and 14 per cent. respectively of added water.

In each of the cases a dairy sample was taken on the same day on the premises of the seller, and the degree of adulteration certified was obtained by actual comparison of the two samples.

The results of proceedings were as follows: In one case (18 per cent. of adulteration) the vendor was fined 20s., and costs. In another, where the adulteration reached 30 per cent., a fine of 50s., and costs, was imposed. In three instances the cases were dismissed because there was no contract between the vendor and consignee.

These cases raise two important points: 1st, the law which allows an unscrupulous milkman to adulterate the milk supply to a public institution and escape punishment because there does not happen to be a contract between the parties, calls for amendment. 2nd, a milkman supplying a large institution will not be deterred from his evil practices by a small fine, for which he can recoup himself by a few days continuance of adulteration. Thus, for example, a dairyman supplying 50 gallons per day at 10d. per gallon of a liquid purporting to be milk, but really containing 35 gallons of milk and 15 gallons of water, is receiving 12s. 6d. a-day for the added water. Supposing this man to be fined 50s., he can repay himself by going on adulterating for four days longer, or may even have more than done so by the time of the hearing of the case.

A year's profits on such a scale amounts, of course, to £228 2s. 6d.

CHLOROSIS AN INFECTIOUS DISEASE? — Dr. Clément, of the Hôtel Dieu, Paris, has found that in chlorosis the spleen is always enlarged, contrary to the belief of most medical men; and that the enlargement disappears *pari passu* with the recovery of the patient. He points out that the characters of the disease are quite compatible with the view that it is a specific infectious disorder. Phlegmasia dolens, which is common in specific fevers, is also a common complication of chlorosis. Fever is by no means rare in chlorosis, which also often has an acute onset, and occasionally appears to be epidemic. For instance, Dr. Clément once had eight cases within three months in a place of only 860 inhabitants, and all were in easy circumstances and living under favourable conditions. He has often noted the existence of dry pericarditis in chlorosis, especially at the level of origin of the large vessels.—*Lyon Méd.*

THE WORKING OF MEASLES NOTIFICATION.*

By A. Bostock Hill, M.D., D.P.H., M.O.H. for Sutton Coldfield.

In the third quarter of 1892 there were notified under the Act five cases, while in the fourth quarter 253 cases were notified. The disease broke out in epidemic form on November 21st, and 20 cases were reported up to the end of the month. In December 232 cases were notified, and practically the same number, viz. 228, in January. The epidemic then declined rapidly, only 54 cases being notified in February, 64 in March, and 22 in April, while there has been no other case up to date. I have before stated that the disease first assumed an epidemic form in the centre of the town, chiefly in Maney Ward. In the early part of January it went to the northern part of the town or Hill Ward, while in March and April it again attacked Maney, and to some extent Boldmere and Trinity Wards. Altogether during the epidemic 620 cases were notified, and of this number only nine deaths were registered, and all these occurred in the first quarter of 1893. Although the epidemic was very widespread it was of a very mild type, the mortality only being 1·4 per cent. of the cases notified. It is very probable that some few cases were not reported, so that the mortality is even lower than the above figures show. All the deaths were, with one exception, in children under five years of age, and of these eight, six were in children two years and under, so that we again see here the importance of shielding very young children from the infection of measles as long as possible. I was unable, after patient and diligent investigation, to trace any new source of infection into the borough, and I am of opinion that, owing to the fact that we have had such a few cases during the last two years, there was a large amount of inflammable material, so to speak, when once the disease had made headway.

Energetic measures were adopted from the very beginning of the outbreak, and on December 5th I saw the Mayor and suggested to him that the schools in the centre of the town should be closed, and I may add the school authorities voluntarily accepted this suggestion, and the schools in question were shut up until the Christmas holidays. As the epidemic still showed no signs of abatement, I reported to the Health Committee in January that it would be undesirable for them to be opened at that time, and an order was consequently made for them to be closed until January 23rd. This was done, and the central schools re-opened on that day. In the meantime the disease had made its appearance in Hill Ward, and it became necessary to close the elementary schools in this neighbourhood, and these remained closed until February 13th. After the schools were closed, in each case they were thoroughly disinfected by the inspector. Amongst the general precautions taken I may add that every house in which a case was notified was visited, and handbills were distributed suggesting precautions which it was desirable to take, and in the early stages of the epidemic an attempt was made to disinfect the premises. This, however, proved to be impossible with the staff at my disposal.

Although it cannot be said that notification appeared to have much influence in arresting the spread of the disease, I am of opinion that much good was done in the control that was exercised on patients by the visit of the inspector, and that in this way exposure to chill was prevented in many cases, with the result that the mortality was diminished. In the two previous years since notification was established, I have found that the closing of the particular school affected has at once prevented the further spread of the disease; but in the late epidemic less good appears to have resulted. There can be no doubt, however, that there is no more valuable method of checking the spread of measles, as a rule, than that of preventing the association of children which must of necessity take place at elementary schools.

* From a report to the Health Committee, June 7th, 1893.

OBITUARY.

Henry Welch, M.D., B.Sc.Edin.

By the death of Dr. Henry Welch, which occurred at his residence, near Lancaster, on April 2nd, the profession has lost a most amiable member and the public health service an enthusiastic worker. Dr. Welch, who was but 37 years of age, was the last representative of a well-known Lancaster family. He was educated at the local grammar school, and thence proceeded to Edinburgh, where he graduated M.B. and C.M. in 1878. Subsequently he took the degrees B.Sc. (Public Health) and M.D. with honours. Coming up to Liverpool, he served as house physician at the Royal Infirmary and house surgeon at the Royal Southern Hospital, and eventually went to Blackpool, where he was appointed medical officer of health in 1883. Here he did his utmost for the improvement of the town, and it was on his initiation that the Corporation built the Sanatorium (an infectious hospital) and the refuse-destructor, and resolved on the erection of the public abattoir, not yet completed. From time to time he contributed papers, showing originality and observation, to current medical literature, *e.g.*, "The Relation of Diphtheria to Scarlet Fever" (*Practitioner*, 1886), and the "Etiology of Phthisis" (*Ibid.*, 1890). He manifested much interest also in the proceedings of the North-Western Association of Medical Officers of Health (now the North-Western Branch Society), and was elected President in 1890. His address on this occasion, entitled "Infant Mortality in

large English Towns," showed much painstaking research and power of generalisation. Just at this time, when he had already achieved much and promised so well, symptoms of pulmonary phthisis became so serious that, acting on professional advice, he resigned his appointment and retired to a little property at Halton, which he had inherited. He spent two winters at Davos Platz, and in the winter of 1892-93 went to Bloemfontein, in the Transvaal. No doubt he benefited thereby. Last winter, however, he was too ill to venture abroad. He gradually declined in health, and the end came peacefully at Halton on one of the sunny days of this spring. The funeral took place at Silverdale Cemetery, 13 miles from the deceased's residence. Dr. Welch was unmarried, and was the last of a family of five, all of whom died of consumption.

LAW REPORT.

Diseased Meat: Prosecution at Newcastle-upon-Tyne.

At the Newcastle Police Court on February 23rd, before Dr. Page and Mr. J. C. Swan, George Pearson, farmer, Thirsk, was charged with being the owner of four quarters of beef deposited for the purpose of sale as human food on January 25th, the same being diseased and unfit for the food of man.

Mr. R. S. Holmes appeared for the Corporation, and Mr. C. M. Dix for the defence. In opening the case Mr. Holmes said that on January 25th defendant had sent four quarters of beef, affected with tuberculosis, to Mr. Tindall's dead meat market for sale. There was a certificate with the meat, signed by a Mr. Wood, M.R.C.V.S., stating that in his opinion the flesh was fit for food. However, he (Mr. Holmes) would prove that the meat was diseased and quite unfit for food, and if the case was proved to the satisfaction of the Bench, he asked their Worships to inflict a substantial penalty, as the Corporation was very anxious that the practice of sending diseased meat to Newcastle should be put a stop to. Inspector W. Hedley stated that his attention was called to the meat in question by Mr. Tindall's foreman on January 25th. It had been received from Thirsk that morning. On examination he found that nearly all the pleura had been removed, but there was still sufficient left with tubercle attached to show that the animal had been extensively diseased. He seized the beef, and it was seen on the following day by the medical officer of health, and was afterwards ordered by the magistrates to be destroyed. Acting on the instruction of the medical officer of health, he cut some pieces off the flesh and submitted them to Professor George Murray for bacteriological examination.

Dr. Armstrong, medical officer of health, said the carcass was extensively affected with tuberculosis in an advanced stage, and described the case as a very bad one, the disease being general and the meat quite unfit for food.

Mr. Holmes was proceeding to call Mr. Clement Stephenson, F.R.C.V.S., and Professor George Murray, when Mr. Dix admitted the ownership and also that the beef was diseased. He then made a powerful appeal to the Bench, urging that his client was perfectly innocent in the matter, and that he had no knowledge of the disease; that when the cow was killed a veterinary surgeon was called in to examine it for fear there might be anything wrong, and that he had given a certificate that the meat was fit for food; that his client acted on that advice, and had been perfectly honest and straightforward.

Mr. Holmes pointed out that it was not necessary for him to prove that the defendant had knowledge of the disease, but in this case he must have known the animal was diseased. It was not usual to peel off the pleura when an animal was slaughtered, nor to call in a veterinary surgeon to examine beef that was sound. Neither was it usual for animals to be killed at Thirsk and the meat sent to Newcastle. Defendant was fined £2, and costs.

It was agreed by the Bench that the expenses of Mr. C. Stephenson and Dr. Murray should be defrayed by the Corporation.

BACTERIOLOGY.

Action of Physical Agents upon Bacteria.—Meltzer* has made an investigation of the effects of shaking upon the growth of bacteria, and finds that prolonged shaking completely destroys most organisms. Slight shaking may have a stimulant action. Boyce and Evans† show that the symmetrical pinnate growth of bacterium Lopfii is negatively geotrific, that by equalising the action of gravity the symmetrical growth is abolished, whilst centrifugalisation again induces it.

Action of Sunlight.—Prof. E. von Esmarch‡ gives the result of his study of the subject. He refers to the previous work of Duclaux, of Arloing, in the case of anthrax; of Patella in that of pneumococci; of Santori and Saverio in that of typhoid bacilli, staptylococcus aureus, cholera, and anthrax; Koch in the case of tubercle bacilli, and finally the researches of Fermicelli, Minck, and Buchner (and in this country we may add Marshall Ward). The results of these various observers show that the spore as well as the growing forms may be killed by the direct action of sunlight, even in the cases of microbes suspended in water. Esmarch takes up the question to see whether sunlight can be used for the disinfection of clothes, etc. He finds that the micro-organisms on the

* Studies from the Path. Dept. Coll. of Phys. and Surg. N.Y., 1892-1893.
† Proc. Roy. Soc., 1893.
‡ Zeitschrift f. Hygiene, 1894.

surface may be killed in one or two hours, but those in the deeper layers require a very much longer time. White material is easier to sterilise than black, showing that it is not a question of the warming action of the sun. He concludes that the mode of sterilisation is hardly practicable for clothes. It will be remembered, however, that we possess in the sun one of the most powerful disinfecting agents, and the more refuse is spread over a wide area and the stronger the sun, the more complete is the sterilisation; this was a phenomenon which an observer could scarcely have failed to note during the unusually bright summer of last year.

Sterilisation of Milk at 75° C.—Freeman* has investigated this subject, and finds that a temperature of 75° C. for fifteen minutes, serves to kill, according to his own observations and those of others, the germs of cholera, typhoid, diphtheria, tubercle, and streptococcus pyogenes, staphylococcus pyogenes, bacillus coli communis. He further finds that the size of the curds is not modified by this treatment where the milk is subsequently subjected to the action of the gastric juice.

REPORTS OF MEDICAL OFFICERS OF HEALTH.

Southwick.

Southwick (Sunderland) has become a name of reproach in the sanitary world, and its local authority appears to be determined to maintain its reputation. The annual report of Dr. H. Liston is anything but pleasant reading. We hope that its honest statement of evils will lead in the near future to their remedy.

Southwick has had during 1893 outbreaks of small-pox (for which no hospital accommodation was ready), of typhus and typhoid fevers. When the temporary hospital which was hastily erected had done its work for small-pox, the board appear to have refused to provide hospital accommodation for cases of typhus fever.

Dr. Liston draws attention to the occasional delay (in one case five days) in giving an intimation to the medical officer of health of persons leaving a ship in an infected port.

In such a hotbed for the propagation of disease as Southwick, it does not surprise us to learn that there is no efficient and regular inspection of the district, no compulsory notification of infectious diseases, and that privy middens abound.

Borough of Jarrow.

Notification of Measles.—Dr. S. W. Weir makes the following remarks on this subject:—

As far as precautions can be taken against the spread of measles, in default of isolation in hospital, nothing was left undone or left to chance during the past year, and yet in looking over the record of the past three years, I am regretfully forced to the conclusion that as far as Jarrow is concerned, compulsory notification of this disease has not fulfilled my expectation in limiting epidemics, and the reasons for this in my opinion are—the highly infectious nature of the disease in its pre-eruptive stage: impossibility of isolation in hospital, and the utter worthlessness of so-called isolation at home; the nature of the population, being almost altogether working-class with a high proportion of children; the large proportional number of tenement houses; the aggregation of children in elementary schools; want of universal notification; Jarrow being situated in a thickly populated district is exposed to importation of the disease on every side.

Compulsory notification was adopted in the summer of 1887 when an epidemic was on the wane; consequently, it is only since 1889 that the notification returns of epidemics are trustworthy; indeed, we have only had complete notification since the autumn of 1892, as one or two of the medical men refused to comply with the Act up to that date. These returns are tabulated below with deaths in brackets.

1889.	1890.	1891.	1892.	1893.
613 (28) ...	18 (1) ...	502 (19) ...	1,196 (48) ...	883 (73)

Whitechapel.

From Dr. J. Soane's annual report the following extracts are taken:—

Small-pox Notifications.—During 1893 I received 114 notifications for small-pox; of these 103 referred to persons residing within the district. These cases were removed to the hospitals from places as follows:—From a philanthropic shelter, 1; from a registered common lodging-house, 1; from infirmaries and workhouses, 36; from general hospitals, 25; from the Well Street Home, 1; from the Tower of London, 1; from private houses, 38. A more minute investigation shows that in many of the cases the disease was contracted elsewhere than at the address given on the notification form, and this matter is now being investigated by the Local Government Board. The inquiry must produce useful information, and as it refers to the whole of the metropolis, I do not propose now to further discuss this part of the subject.

The Dead-lock at the Metropolitan Asylums Board.—At various times during the year I was informed by the Clerk to the Metropolltan Asylums Board that the beds at the various hospitals under the care of the managers were occupied, and that cases could only be admitted as vacancies occurred. From correspondence with the Clerk, and from other sources, I became aware that the officials at Norfolk House decided which cases should have priority in removal. It thus frequently happened that cases which I deemed to require immediate attention, were passed over for other less urgent cases. This is a matter for the consideration of the managers, should a block ever again take

* Medical Record, June, 1893.

place. I would suggest that the medical officer should be allowed to know in what order the cases ought to be removed from his district, if any departure has to be made from the plan of removing cases in the order in which the notifications arrive at the office of the Metropolitan Asylums Board. I sincerely hope that never again will so grievous a dead-lock occur. I have no doubt that many will be surprised to learn that our copies of the telegrams and letters, which were sent by the inspectors to the Metropolitan Asylums Board, asking for the removal of cases, show that the application was repeated, in three instances, 21 times; in one case, 18 times; in three cases, 15, 16, and 17 times respectively; and for a less number of applications the following list will prove the loss of time to the inspectors, and the anxiety to the friends of the patients from the delay which so frequently took place in the removal of the cases :— In 5 cases 13 applications were made, in 2 cases 12, in 4 cases 11, in 6 cases 9, in 5 cases 8, in 9 cases 7, in 8 cases 6, in 5 cases 5, in 14 cases 4, in 12 cases 3, in 8 cases 2. As a result, many parents declined at last to have their children removed at all, and I am not certain that the disease would have attacked more persons in this district, had all cases been treated at home. If good is expected to be the outcome of the Metropolitan Asylums Board system of removal, such can only be expected when removal is promptly effected.

Spilsby.

Dr. F. J. Walker, M.O.H. for the Spilsby Rural Sanitary District, draws attention to the not very widely known fact that under the provisions of the Contagious Diseases (Animals) Act, it is the duty of the veterinary inspector on finding a case of anthrax to notify it to the medical officer of health. Nothing is said in the Act as to the duty of the medical officer of health on receiving the notification; but Dr. Walker emphasises the importance of immediate disinfection and burial, or better still, cremation of the carcass.

An interesting example of contamination of water by escape of coal gas from leaky mains is also given.

Scarborough.

Dr. R. Cuff, in his annual report to the Scarborough Rural Sanitary Authority, draws attention to several isolated cases of small-pox, which led to negotiations with the urban sanitary authority for the reception into their hospital of such cases. The negotiations led to an agreement advantageous to both parties to the bargain. Dr. Cuff adds, "The wandering of such convalescent tramps has not infrequently proved the origin of very serious epidemics of small-pox in various parts of the country, and it is not unlikely that outbreaks of cow-pox which have been termed spontaneous may be due to the same cause."

ANNOTATIONS.

We are glad to notice the extension of teaching Public Health in the Owens College of the Victoria University, the Council of which has, subject to the approval of the Court of Governors, appointed Dr. Arthur Ransome, F.R.S., Professor of Public Health, and Mr. Charles E. Paget, M.R.C.S., D.P.H., Medical Officer of Health for the Borough of Salford, Lecturer in Practical Hygiene in the College.

The Duration of Infection in Diphtheria.—From some observations of Tézenas Du Monteil, published in *Prov. Méd.* last year, it appears that convalescents from diphtheria may, after apparent recovery, transmit infection by means of a nasal discharge. The above-mentioned observer examined 48 convalescents bacteriologically, and found the Löffler bacillus in the nasal mucus of 10, whose throats were apparently free from it. The discharge was a simple mucous one, usually unilateral, and depended on the presence of the bacilli. A case is mentioned by Lemoine where a child of three years old, who had a nasal discharge after diphtheria, communicated the disease to another child sixty-three days after apparent recovery, and indirectly to two others.

The Etiology of Ringworm.—In a communication to the February number of the "Ann. de l'Inst. Pasteur," M. Sabouraud has somewhat modified his position as regards the cause of ringworm. It will be remembered that he recently announced that the disease was caused by two distinct organisms, which he called respectively trichophyton megalosporon and microsporon. He now announces that as the result of further researches he has identified the latter with microsporon Audouini, which was described by De Gruby in 1843 as present in "Porrigo decalvans." There seems to be little doubt that de Gruby was accurate in his description, but misnamed his disease, thus causing his observations to be discredited. Sabouraud states now that the organism has quite different characters to the trichophyton megalosporon, and belongs to a different genus. There are three recognised parasitic diseases affecting the scalp—favus and these two kinds of ringworm. In favus the hair is long, discoloured some distance above the orifice, surrounded at its base by a small or large ring of sulphur-colour and plastery consistency. In ordinary ringworm, caused by the "megalosporon," the hair is sparse on the affected patch, each hair being broken short, strongly coloured, and destitute of a sheath. In the other kind, which Sabouraud calls rebellious ringworm, the hairs are fine, greyish, abundant, very near to one another, and often inclined in the same direction. Each one has a grey sheath at the base, like an epidemic pellicle. This form is the true epidemic ringworm of the schools; it is almost exclusively contracted in early infancy, and is rare after eight

years of age It may cause "pityriasis alba" of the scalp, and not be recognised as ringworm, as the hairs are often unbroken. It never causes tinea circinata nor sycosis of the beard, nor ringworm of the nails, but is the most contagious of the infantine mycoses.

THE PEABODY BUILDINGS.—From the annual report of the trustees for the year 1893 we learn that the trustees now provide for the artizan and labouring poor of London 11,273 rooms, besides bath-rooms, laundries, and washhouses. These rooms comprise 5,070 separate dwellings, viz., 75 of four rooms, 1,787 of three rooms, 2,404 of two rooms, and 804 of one room. The number of residents on December 31st was 19,937, an unusually low number owing to temporary alterations. The average weekly earnings of the head of each family in residence at the close of the year was £1 3s. 7½d. The average rent of each dwelling was 4s. 9¼d. per week, and of each room 2s. 1¾d. The rent in all cases includes the free use of water, laundries, sculleries, and bath-rooms. The birth-rate for the year reached 35·1 per 1,000, which is 4·1 per 1,000 above that of all London for the same period. The death-rate, including the deaths of 65 inhabitants of the buildings who were removed to hospitals, was 17·6 per 1,000, which is 3·7 per 1,000 below the average of London. The infant mortality was 126·4 in each 1,000 births, or 37·9 below that of London.

THE LAW AS TO EXPOSURE OF INFECTED PERSONS.—I am of opinion that at no time was it so necessary that the law as to the exposure of infected persons should not only be enforced on every possible occasion, but strengthened. For instance, it is no legal offence to send anyone to their home when suffering from infectious disease, provided there is no unlawful exposure on the way. Not very long ago I knew a case where a domestic servant suffering from scarlet fever was got out of bed and sent to her cottage home at eleven o'clock at night without any notice to the family, and no legal offence could be brought home to those responsible, as the patient was sent in a hired conveyance after due notice to the driver, and the conveyance subsequently disinfected. At this present moment in your district I have a most heartless case under investigation, where a domestic servant on the third day of illness was told to get out of bed and sent home by train to Whitchurch from Birkenhead, and is now lying ill with scarlet fever in her cottage home, where there is a family. In this case there was no excuse, as I have ascertained that the patient would have been at once received into the isolation hospital at Birkenhead. The girl had only been in the situation a few days, and when she went there was a case of scarlet fever in the house which had been notified, and which had not recovered. No medical man had been called in to see her, and therefore I fear no legal penalty has been incurred, as nothing but presumptive evidence of knowledge of the probable nature of her illness can be proved against those responsible. Owing either to the fear of the publicity involved in the removal of a patient to a fever hospital or for other reasons, I know it to be a fact that employers in large town very frequently send suspicious cases to their homes in the country at once when ill, without calling in medical attendance, and sometimes in cases where a doctor has been called in and given a dubious diagnosis. Such cases are, in my opinion, even more common now than formerly. —*Dr. W. N. Thursfield's Report to the Whitchurch R.S.A.*

THE ARREST OF MAORI DECAY.—The correctness of the commonly accepted idea that a mysterious blight falls on native races as the tide of civilisation and the white man advance appears to be somewhat doubtful. The guerilla warfares between different tribes of Maories, especially after they secured fire-arms, offer a partial and more natural explanation for the decline of the Maori population from about 150,000 when Captain Cook visited them to 100,000 in 1850; though it will not account for the further decline to 42,000 at the present time (a slight increase, by the way, on the figures of 1886). The causes tending to the further deterioration of the Maori race are thus summarised by the Registrar-General of New Zealand:—

> An excessive infantile mortality, owing to improper food, exposure, want of ordinary care and cleanliness; the constitutions of the parents debilitated by past debauchery; the practice of placing the sick in the hands of the native doctor (*tohunga*), instead of applying to the medical officer of the district; the sterility induced by widespread immorality among quite young females before marriage; the partial adoption of European habits and costume, and the continual reversion to the habits and costume of barbarism, with a system rendered more susceptible to external influences, especially those of a humid and changeable climate, thereby tending to promote the spread of diseases, notably those affecting the respiratory organs; and to a certain extent the continual intra-tribal marriages resulting in diminished fruitfulness and enfeebled constitutions.

The figures as to the relative proportion of the two sexes at different ages also throw some light on the question:—

> The males under 40 years are only 70·93 per cent. in the case of the Maori population, but 76·38 per cent. of the New Zealand European, and 76·54 of the English population. The females under 40 are 74·77 of the total Maori females, but 82·35 for New Zealand Europeans, and 75·01 in case of English.

PRESERVATION OF VACCINE LYMPH.—According to *Médecine Moderne* a good plan is to add to fresh lymph equal parts of glycerine and water, both sterilised, and to then preserve in tubes. It is stated to keep perfectly for more than a year and never to fail.

REVIEWS.

Dwelling Houses: Their Sanitary Construction and Arrangements. By W. H. CORFIELD, M.A., M.D., Oxon. Third edition. (H. K. Lewis, 136, Gower Street, W.C. 8vo., 3s. 6d.)—This compact and comprehensive treatise is so well known that its third edition requires little beyond a formal notice. Facility of reference is increased in this edition by the addition of an index prepared by Dr. Kenwood. There is hardly a point in house sanitation which is not concisely and clearly explained in the pages of this book, and it can be therefore recommended as a safe guide to students and others interested in the subject.

Sanitation at Paris, Brussels, and Berlin. By T. M. LEGGE, M.B., D P.H. (Southwood, Smith, and Co., 4, King Street E.C.)—This pamphlet is a reprint of a series of articles by the author, which have already appeared in the *Medical Magazine*. They describe the details of Parisian, Brussels, and Berlin sanitation as actually found by him on careful personal examination. Some of the information given is novel, and it is all up to date. On some points, particularly in reference to thorough meat inspection, we have much to learn from Continental hygienists.

Lectures on the Sanitation of Industries and Occupations. Delivered at the Sanitary Institute.—In the present volume six lectures dealing with the various aspects of this question are now published together. The first deals with the general aspects of the question. The second, by Dr. Arlidge, a well-known authority on occupational mortality, deals with non-metallic dusts and the manufacture of pottery. The third, by Dr. Sinclair White, deals with metallic dusts and cutlery, a subject with which Dr. White's knowledge of Sheffield industries renders him specially competent to deal. Dr. Arlidge contributes the fourth lecture on textile manufactures, while Professor Thomas Oliver deals with the question of metallic poisons, especially lead; and Mr. Watson Smith with the manufacture of alkalis and acids. The lectures on special industries will amply repay careful study, and it may be hoped that their scope will be extended in the near future, as the sanitation of industries is becoming of daily increasing importance.

The River Severn Considered as a Source of Drinking Water. With some Remarks upon the Qualities of Water in General. By J. H. GARRETT, M.D., F.L.S. (From the proceedings of the Cotteswold Naturalists' Field Club, 1893 94.)

In a pamphlet of 38 pp. Dr. Garrett has embodied much information as to water analysis in general and the water of the River Severn in particular. Dr. Garrett's views on the danger of typhoid fever or cholera from river water are decidedly optimistic. "River water unless grossly polluted with sewage material is certainly not a medium suited to the development of typhoid bacilli." With regard to the Tees Valley outbreak, he says: "That the water may have caused the disease by some accidental fouling is possible or even probable, but that the whole of the water of the Tees was affected by typhoid bacteria derived from a very small amount of possible pollution at a point nearly twenty miles above where the water was removed for drinking as suggested by Dr. Barry is an idea that cannot be entertained." This is not inconsistent to his mind with the view that the Hamburg outbreak of cholera was caused by polluted river water, as the Elbe was very grossly polluted with infected sewage. In the Severn in his view the volume of water is so vast in proportion to the actual solid material of the sewage discharged into it that no marked or permanent effect on the quality of the water of the Severn is produced. Analyses made by Dr. Swete and Dr. Garrett show that the oxygen in the Severn water above Worcester is at saturation point, and is reduced opposite and below the town owing to the oxidation of organic matter discharged into the river, but five miles below Worcester the water has returned to its normal saturation by oxygen and also to its normal yield of ammonia. Similarly the bacteria increase opposite Worcester, but three or four miles lower down have come back to their normal numbers.

Dr. Garrett's general conclusion is that the Severn forms an excellent source of drinking water after being subjected to efficient filtration.

On the Features which Distinguish Epidemic Roseola (Roserash) from Measles and from Scarlet Fever. By CLEMENT DUKES, M.D Lond. (J. and A. Churchill. 1894. 1s.)

This pamphlet is a reprint of an important paper read by the author before the members of the Medical Officers of Schools' Association. Lest there should be any confusion as to nomenclature, we may at once say that by epidemic roseola Dr. Dukes means rötheln; Dr. Dukes hopes that the latter name will cease to be used, and that its popular name, "German measles," will be replaced by Roserash.

Dr. Dukes' statement that he has seen no real instances of children suffering from the same infectious illness twice is not in unison with the experience of medical officers of fever hospitals, who not infrequently have children convalescing from scarlet fever developing a second attack.

The points of differentiation between epidemic roseola and measles and scarlet fever are very clearly stated by Dr. Dukes. Among others, it is mentioned that roserash is essentially a spring and summer disease, while scarlet fever is a disease of autumn and early winter. Unfortunately for this distinction, the anomalous cases are very apt to be out of season! Dr. Dukes describes two probable abortive forms of epidemic roseola, one characterised by pink conjunctivæ only, and the other by no other symptoms beyond slight feverishness and enlargement of the lymphatic glands throughout the body. In all cases of epidemic roseola there is enlargement and tenderness of the lymphatic glands throughout the body, an important point in diagnosing between it and measles.

Dr. Dukes does not think it necessary to isolate cases of scarlet fever until all desquamation has ceased from the hands and feet. The peeling of the tongue on the fourth day, followed by peeling of the face and behind the ears is regarded as characteristic of scarlet fever.

Disease and Race. By JADROO. (Swan Sonnenschein and Co. 1894.)

This brochure may be read with interest by all who are interested in the problems of the origin of infective diseases. We fear that, however much interested they may be, they will not find many additional facts, as the book consists chiefly of speculative reasoning, and "an attempt to evolve a little order out of the existing chaos . . . for medicine is an edifice without mortar, valuable and innumerable facts with but little cohesion or relation to one another."

The author is of opinion that gonorrhœa and leprosy produced syphilis, which latter is a hybrid disease. In support of this contention he advances the statement that in Great Britain leprosy lasted longest in the most distant parts (*e.g.*, Cornwall, parts of Ireland, and chiefly the islands of Scotland) where syphilis would reach least and latest. The gradual disappearance of leprosy among white races is thus due to the gradual and continuous inoculation (apparently with syphilitic virus) of successive generations of white races. If this be true, we suppose it may be inferred that a gradual syphilisation of the whole community is desirable. Scrofula is regarded as a manifestation of hereditary syphilis; tuberculosis, and lupus, its skin manifestation, as modifications descended from syphilis.

Inoculation of disease thus plays, according to our author, an important part in producing that greater immunity from various diseases, which gives civilised man the superiority over the Maori, the Fijian, etc. It is evident, therefore, that if the reproduction of a mild type of infectious disease could be ensured, a general system of voluntary infection ought to supersede our expensive isolation hospitals!

It is impossible to follow these speculations further. Those interested in them will naturally turn to this volume, which Messrs. Swan Sonnenschein and Co. have produced in a handsome and convenient form.

The Medical Annual for 1894. (John Wright and Co., Bristol. 7s. 6d.)

The twelfth issue of the *Medical Annual* is even more complete and useful than its predecessors. The number of subjects dealt with is surprisingly great, and the practitioner will find in nearly every article useful hints in diagnosis and practice. One of the fullest and most valuable articles is by Dr. James Shaw on "Facial Expression in Various Forms of Insanity," illustrated by a large number of photographs.

Dr. John Strahan contributes a thoughtful article on "Fevers and Eruptions." We are sorry, however, to see that roseola or rose rash is still described as a disease, separate from rötheln or measles, or scarlet fever, though the diagnostic points described are those which characterise rötheln. A roseola, "which is often preceded by sore throat" and yet is not rötheln or scarlet fever, must (apart from the prodromal roseola of small-pox, etc.) be a great rarity; and it is a pity to drag it into the front rank, where it will form a frequent excuse for slovenly diagnosis, and be the cause of serious practical mistakes.

Dr. Priestley contributes a useful summary of sanitary legislation, new inventions, etc., during 1893. The remarks made on the Hermite system of sewage treatment would probably have been modified had Dr. Priestley seen Dr. Kelly's article in the present number of PUBLIC HEALTH.

The book has appendices supplying miscellaneous information, including a list of new books, and of medical periodicals, etc.

Sewage Disposal in the United States. By GEO. W. RAFTER, M.Am. Soc., C.E., and M. N. BAKER, Ph.B. Associate, Editor *Engineering News*. (New York: D. Van Nostrand and Co. London: Sampson Low, Marston, and Co. 1894.)

For many years American engineers trusted to British observations, and based their methods of sewage disposal on British models. The text-books and the reports of State Boards of Health were largely composed of descriptions of British systems. Now the same thing cannot be said. Apart from the present work, which is the first American systematic treatise on sewage disposal of American origin of a complete and exhaustive character, English students of this subject find it indispensable to refer to the elaborate and continued experiments of the Massachusetts Board of Health for data of the greatest value. The necessity for a special American study of the subject is evidenced by the fact that the climatic conditions are so different from those holding good in Europe.

In Part I. of this important work the governing principles of sewage disposal are dealt with; while in Part II. the salient features of the principal American sewage disposal works are given, with details as to cost of construction and administration. This portion of the work is copiously illustrated. There are altogether seven plates, and 116 figures in the text.

The thoroughness of the preliminary discussion may be gathered by a single instance. In discussing the well-known outbreak of typhoid fever at Lausen, Switzerland, a map of the district is given, and there are exact references to the original accounts of the epidemic.

The investigations carried out by the Massachusetts State Board of Health are given in full, the details as to trade pollutions being especially interesting.

On the fallacy of the supposed money value of sewage, the authors say that it would be as reasonable to expect farmers to manure their land with the smoke of cities as with sewage. They hold that there are no detailed data proving that sewage disposal in tide-water, under proper conditions, is in any way a waste of raw material, as the food supply of fish is thereby increased.

In determining the requirements of a city for, say, twenty years ahead, the authors recommend a graphic method of approximately estimating the future population, which in the cases quoted gave accurate results. The population of the given city is plotted out for successive census periods, and continued upwards in the direction indicated by the sweep of the curve.

It appears from the comparison of a number of analyses that the ordinary sewage of English towns is considerably more concentrated than that of American towns.

The chapter on nitrification and the nitrifying organisms is a particularly valuable one. The history of the subject is given in detail, Warrington's papers and the subsequent Massachusetts investigations being fully summarised. The value of this and of other chapters is enhanced by the bibliography with which it ends.

On the question of broad irrigation, the conclusion reached is that a mean temperature of 20° to 25° F. in the coldest winter months considerably interrupts purification by broad irrigation. Purification by intermittent filtration can probably be successfully worked at a lower temperature than broad irrigation. As an instance of the thoroughness which characterises this work throughout, we may mention that a special chapter is devoted to the *Beggiatoa alba*, or sewage-fungus, in which Mr. Justice Denman's decision in the appeal case as to the Croydon sewage works is given.

We have no space to follow the important matter contained in Part II. We have said enough to indicate that this work is of great importance, that it will be invaluable for reference and consultation; and that, while it will be almost indispensable to the sanitary engineer, medical officers of health, who have to deal with some aspects of sewage disposal, will find it of great interest and value.

BOVINE TUBERCULOSIS.—There has been a good instance lately in France of the diagnostic value of injections of tuberculin. In April, 1893, the veterinary inspector at the slaughterhouse of La Villette seized, for general tuberculosis, a fat cow coming from the Ecole de Grignon. A few months before, another cow from the same place had been seized for the same reason. An order was issued to seize the remaining animals and test them with tuberculin, and to thoroughly disinfect the sheds. Of the twenty-three animals tested none presented clinically any suspicious signs, and only one was said to suffer from chronic cough. After inoculation twelve showed decided rise of temperature, and were subsequently killed in presence of a number of inspectors and private veterinary surgeons. Most of the beasts had very limited lesions. In seven these would have escaped notice, in the opinion of the inspectors present, and were only found after a prolonged search. Three other animals had slight lesions, but would probably have arrested attention. In two there were grave and extensive lesions, notwithstanding that they were in a good state of fatness, and without an official inspection the meat might have been sold as of first quality. It is stated that heredity was shown to have had little influence in producing the disease, so that the owner of the cowsheds, now thoroughly alive to the danger, decided only to buy animals which had passed the tuberculin test. Of eight fresh cows, seven proved to be sound; but the eighth, a superb Swiss cow, showed a decided rise of temperature, and was rejected. It would be for the public good, and probably also pecuniarily profitable, for cow-keepers and cattle dealers in England to use the same precautions.

CORRESPONDENCE.

VAGRANTS AND THE DISSEMINATION OF DISEASE.

To the Editor of PUBLIC HEALTH.

SIR,—It must appear to many as a strange anomaly that a society which so unanimously condemned the principle of quarantine in reference to ships from infected ports, but two short years ago, should now advocate a resort to this system in dealing with vagrants from infected districts, and I hardly anticipate that clause 4 of the committee's recommendations will meet with much sympathy from headquarters.

At a recent conference of the East Anglian Boards of Guardians it was decided to recommend that each union should adopt what is known as the Gloucestershire ticket system, and I have promptly seized the opportunity to impress upon the several Boards the desirability of still further developing their system by the addition of a medical inspection of all vagrants without tickets, and especially of all those who are known to have come from districts infected with smallpox or other virulent infectious disease.

I am inclined to think that the possible source of uncertainty which might result from an exchange of tickets by tramps has been greatly exaggerated, for those having what may be termed "clean bills of health" will scarcely be likely to part with them, while the destruction of a foul bill of health will in no way exempt the bearer from a medical inspection.

I beg to enclose a copy of my circular letter, which runs much on the lines indicated, at the January meeting, by Dr. Gore King, Dr. Russell Maclean, Dr. Louis Parkes, and others, in regard to the registration and medical inspection of vagrants, a copy of which has been forwarded to every union authority in the two counties (Norfolk and Suffolk), and I am in hopes that an experiment will be made of this system during the coming summer, as it is important that our health resorts should be kept as free as possible from zymotic diseases, and the success of such a scheme in this district would doubtless speedily lead to its more general adoption.—I am, etc.,

FRANCIS W. CLARK, M.B., D.P.H.,
M.O.H. Borough and Port of Lowestoft.

March 29th, 1894.

The following extract from Dr. Clark's circular letter explains more fully the details of the proposed "ticket system":—

"The adoption of the ticket system, as recommended by the Poor Law Conference at Ipswich to the Eastern Counties' Boards of Guardians, will, if rightly worked, prove a valuable safeguard to the public health by enabling sanitary authorities to exercise some little supervision over that migratory class of paupers.

"Should this system come into force, each tramp will carry a ticket bearing upon it the names of his previous places of call, and also his destination, and I would suggest that should any of the towns or districts through which he has passed during the previous fortnight be known to contain cases of smallpox, or of cholera, typhus, or any other virulent infectious disease, such persons should at once be placed in separate cells and undergo a medical examination before being allowed to depart or to mingle with others. All tramps arriving without tickets should undergo a similar medical inspection, and by this means suspicious cases of infectious disease could be at once isolated and risk of the spread of infection would thus be greatly minimised.

"It will, of course, be seen that the more extended the ticket system becomes the greater will be the protection afforded, and the less the cost of medical inspection, as the number of tramps without tickets would be proportionately reduced, and it would at first no doubt be mainly those who would, on entering a 'ticket area,' require the services of a medical inspector. The only alternative method of dealing with the dissemination of infectious disease by tramps would be to enforce a system of quarantine in reference to those who were known to have come from infected districts, and as this would entail the compulsory detention of all such for a period of not less than a fortnight, there can, I think, be little doubt as to which plan would be the more practicable, even supposing that powers could be obtained to enforce the requisite term of detention.

"Briefly, then, I would advocate the application of the same system to tramps from infected areas as has been applied during the past two years to all ships arriving from cholera-infected ports, and there can be no question that this method, when compared with the old plan of quarantine, is infinitely preferable, and has proved vastly more successful in combating the introduction of an infectious disease into uninfected districts."

APPOINTMENTS.

MEDICAL OFFICERS OF HEALTH.

CROCKER, J. H., M.B.Vict., L.R.C.P.Lond, appointed M.O.H. for the Borough of Eccles.

CROWTHER, THOMAS, M.D., M.R.C.S.Eng., appointed M.O.H. for the Luddenden Foot U.S.D. of the Halifax Union.

DUDFIELD, REGINALD, M.A.Camb., M.B., D.P.H., L.R.C.P.Lond, M.R.C.S.Eng., appointed M.O.H. for the Borough of Paddington.

FINDLAY, GEORGE, M.A., M.B.Aber., re-appointed Deputy M.O.H. to the Shipston-on-Stour R.S.A.

GARLAND, E. C., L.R.C.P.Edin., M.R.C.S Eng., re-appointed M.O.H. to the Yeovil Town Council.

GRAY, M. J., appointed M.O.H for the Stanhope U.S.D. of the Weardale Union.

GAYLOR, EDWARD, L.R.C.P.Edin., L.M., L.F.P.S. Glas., re-appointed M.O.H. to the Alfreton Local Board.

HOFFMEISTER, WILLIAM, M.D. Heidel., L.R.C.P.Lond., M.R.C.S.Eng., re appointed M.O.H. West Cowes Local Board.

HITCHINS, THOS. HY., M.R.C.S.Eng., re-appointed M.O.H. to the Shipston-on-Stour R.S.A.

JOHNSON, H. S., M.R.C.P.I., L.F.P.S.Glas., re-appointed M.O.H. to the Totnes R.S.A.

JOHNSTONE, G. W., L.R.C.P.Edin., L.F.P.S.Glas., re-appointed M.O.H. to the Upholland Local Board.

KEYWORTH, A. E., M.R.C.S., appointed M.O.H. to the Maple U.S.D.

NICHOLLS, J. M., M.R.C.S., L.R.C.P.Lond., appointed M.O.H. to the St. Ives Town Council.

NEICH, JAS. THOS., D.S.Sc.Vict., re-appointed M.O.H. for Atherton.

PRATT, J. W., L.R.C.P.Edin., M.R.C.S.Eng., re-appointed M.O.H. to the Wivelscombe Local Board.

PIGGOT, FRED. C. H., re-appointed M.O.H. to the Teignmouth U.S.D.

PROSSER, FRANK, M.B., C.M.Glas., re-appointed M.O.H. to the Rainford Local Board.

PARKER, JOSEPH EDMUND, M.R.C.S.Eng., appointed M.O.H. to the Ince Local Board.

ROBERTS, CHARLES, M.R.C.S.Eng., re-appointed M.O.H. to the Uxbridge Union R.S.A.

REES, HUGH, M.R.C.S.Eng., re-appointed M.O.H. for the Colwyn Bay Local Board.

VICKERS, C. W., L.R.C.P.Edin., M.R.C.S.Eng., re-appointed M.O.H. to the Paignton Local Board.

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PUBLIC HEALTH,

The Journal of the Incorporated Society of Medical Officers of Health.

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Medical Officers of Health and other Correspondents are requested to send regularly all published reports and matters of interest bearing upon Sanitation to the Editor, 11, *Gloucester Place, Brighton.*

NOTICE.

THE INCORPORATED SOCIETY OF MEDICAL OFFICERS OF HEALTH.

20, Hanover Square, London, W., May, 1894.

AT the next meeting of the Society the following candidates, duly nominated, will be balloted for:—

As Fellows—

FRANCIS WILLIAM ANDREW, Hethersett, Hendon, M.O.H. for Hendon; proposed by A. Wynter Blyth, seconded by John C. Thresh.

J. HAGUE CLEGG, M.R.C.S., Heaton-Royds, Stockton-on-Tees, M.O.H. Stockton-on-Tees U.S.D.; proposed by T. Eustace Hill, seconded by John C. Thresh.

JOHN HANKINSON GORNALL, M.R.C.S., L.S.A., Ribbledale House, Latchford, M.O.H. Borough of Warrington U.S.D.; proposed by Francis Vacher, seconded by G. A. Kenyon.

J. W. HEMBROUGH, M.D., L.S.Sc., Earsdon, Northumberland, M.O.H. Northumberland C.C.; proposed by Henry E. Armstrong, seconded by F. P. Wightwick.

T. LIVINGSTONE, M.D., J.P., Greenbank, Stanhope, M.O.H. Stanhope Division of the Weardale Union; proposed by T. Eustace Hill, seconded by John C. Thresh.

FREDERICK STOCKWELL, M.B., Bruton, Somerset, M.O.H. Wincanton R.S.D.; proposed by Edward Walford, seconded by D. S. Davies.

J. A. TURNER, M.D., D.P.H., Syston, Leicester, M.O.H. Leicester Combined District; proposed by J. W. Priestley, seconded by J. H. Manley.

As Members—

WALTER DOWSON, M.D., D.P.H., Great George Street, Park Street, Bristol; proposed by E. Walford, seconded by D. S. Davies.

A. H. ROBINSON, M.D., D.P.H., Medical Superintendent, The Infirmary, Bancroft Road, Guildford; proposed by Wellington Lake, seconded by John C. Thresh.

GEORGE BURY WRAY, M.R.C.S., D.P.H.Lond., 26, Annesley Grove, Nottingham; proposed by F. P. Wightwick, seconded by J. C. Thresh.

As an Associate—

JOSEPH LARKE WHEATLEY, Cardiff, Town Clerk, Cardiff; proposed by Edward Walford, seconded by D. S. Davies.

PROCEEDINGS OF THE INCORPORATED SOCIETY OF MEDICAL OFFICERS OF HEALTH.

A MEETING of the Incorporated Society of Medical Officers of Health was held at No. 20, Hanover Square, on Monday, May 21st, 1894. The President (Dr. Woodforde) presided, and the members present included Drs. Sykes, Wynter Blyth, R. Dudfield, Parkes, Fowler, Whitelegge, Willoughby, Stott, Yarrow, Shadwell, Darra Mair, Gibbon, Newsholme, Brett, Davis, Armstrong, Wilde, Hamer, and Drs. Wightwick and Thresh, the Hon. Secs. Among the visitors present were Drs. Herman, Griffiths, Blacker, Whitridge, Williams (Baltimore, U.S.A.), Cullingworth, Tite, Gow, and Robinson.

The minutes of the last meeting of the Society on April 16th, 1894, were read, approved, and signed by the Chairman.

REPORT OF THE COUNCIL.

The HON. SECRETARY read the report of the Council, as follows:—

Your Council have to report that having heard a statement made by Dr. Dudfield, the Society's representative on the Committee formed for the purpose of drafting a scheme for the constitution of a Conjoint Board in connection with the holding of examinations for Sanitary Inspectors, and the granting of Certificates of Competency under the Public Health (London) Act, 1891, as to the first meeting of the Committee held at the offices of the Local Government Board, and having heard the suggested constitution of the Examining Board, they have requested the Hon. Secretary to communicate with the Hon. Secretary of the Committee, and express the unanimous opinion of the Council that the Society should have a larger and more adequate representation upon the Conjoint Board than at present proposed.

Your Council further report that they have authorised the payment of a sum of £5 towards the expenses of the said Committee.

Resolved, on the motion of Prof. BLYTH, seconded by Dr. NEWSHOLME, that the report be received and adopted. Carried unanimously.

Election of Fellows, etc.—The following gentlemen having been duly nominated for election, a ballot was taken, and they were declared by the CHAIRMAN to be unanimously elected.

As Fellows—

WILLIAM DALZIEL, L.R.C.P., etc., Chapter Row, South Shields, late M.O.H. South Shields U.S.D.

JOHN HEDLEY CROCKER, M.B., Ch.B.Vict., M.R.C.S., L.R.C.P.Lond., Monks Hall, Eccles, M.O.H. Eccles U.S.D.

SAMSON GEORGE MOORE, M.B., Ch.B.Vict., 12, Cambridge Street, Liverpool, M.O.H. Port of Liverpool.

As Members—

JAMES PRIESTLEY, B.A., M.B., B.Ch., B.A.O., D.P.H., R.C.S.Eng. and P.Lond., 4, St. Stephen's Road, Paddington, W.

FREDERICK W. GIBSON, L.R.C.P., B.Hy.Durh., 87, Hudson Street, Tyne Dock, South Shields.

J. LODGE PATCH, M.B., D.P.H., 30, Holborn Street, Aberdeen.

Nominations.—A number of candidates were then nominated for election at the next meeting.

Dr. Armstrong exhibited models of a steam steriliser for cholera dejecta, and of a cholera ship, which will be described in the next issue of PUBLIC HEALTH.

THE ETIOLOGY OF PUERPERAL FEVER.

By G. ERNEST HERMAN, M.B.Lond., F.R.C.P.,

Senior Obstetric Physician to the London Hospital, Physician to the General Lying-in Hospital, President of the Obstetrical Society of London.

Before we can discuss the etiology of puerperal fever we must agree upon what we mean by "puerperal fever." The name is old, and therefore vague, for it was invented when pathology was less precise than it now is. I understand by "puerperal fever," a severe febrile illness occurring soon after, and dependent upon, delivery.

It includes a group of diseases. In childbirth the parts are often torn; and all those diseases which may follow when a wound is not kept surgically clean may follow childbirth. The wounds are often slight; but they are exposed to contact with hands, instruments, and dressings which may be bearers of infection; much discharge flows over them from a large canal in which this discharge may be retained and decompose. Hence these wounds are more liable to be infected than other wounds of similar size.

There are different forms of disease produced by infection of puerperal wounds.

There is septicæmia, a disease characterized during life by high fever, great prostration, and death without any physical signs of local disease; and post mortem, by the absence of local morbid changes, and the appearances of death from blood-poisoning.

There is pyæmia, a disease which begins as uterine phlebitis, the decomposing pus from the veins being carried into remote parts of the body, where it produces secondary abscesses, inflammation of joints, panophthalmitis, etc., an illness usually fatal, but not so quickly fatal as septicæmia.

There is the disease which, when affecting subcutaneous cellular tissue, used to be called phlegmonous erysipelas, viz., rapidly spreading inflammation, quickly reaching the peritoneum, and causing fatal peritonitis.

There are the morbid changes which may affect the wounds themselves: the so-called diphtheritic condition, diphtheritic inflammation, progressive traumatic gangrene. True diphtheria, though rare, has been known to attack puerperal wounds.

There is the condition known as septic intoxication, putrid intoxication, or sapræmia, in which the poison, as Koch has shown, is a chemical one, its effects being proportionate to the dose, and ceasing when the poison has been eliminated.

These diseases are known to be produced by micro-organisms, and it is probable that the different forms of disease are produced by different organisms. Whether a microbe can produce different effects in different subjects, or whether it may in successive generations acquire different pathogenic properties are questions for the bacteriologist.

The etiology of puerperal fever thus branches out into two questions. The first is, the origin, life history, and identification, of the microbes. This is a work for the laboratory, not, at the present time, for the clinical physician; nor is it one for which the medical officer of health has, by virtue of his office, any special facilities. This line of investigation may become the more important, and its methods so simplified as to be part of every doctor's daily routine, but it is not so yet.

The second is that of observing the antecedent conditions which are followed by puerperal fever, and by the removal of which puerperal fever is prevented. It is the business of the medical officer of health to find out these antecedent conditions if he can, and by removing them to prevent puerperal fever. It is this aspect of the question on which I propose to speak this evening.

The poison of puerperal fever is given to the patient by contact. It is neither inhaled nor swallowed. The late Dr. Matthews Duncan showed, and his assertion has never been refuted, that no such thing as a true epidemic of puerperal fever has ever been recorded. By "epidemic" he meant an exceptionally great incidence of the disease within a limited area during a limited time, such as occurs when the air of a certain area becomes the carrier of the poison of typhus, or small-pox, or the water or milk supply of a district distributes the poison of scarlet fever or enteric fever.

The poison is often carried from one patient to another. It may come from dead organic matter. It is possible that in hospitals it may float in the air. Whatever the source of the poison, it is carried to the patient by its adhesion to hands, instruments, or dressings which touch the patient. The poison is killed by antiseptics. Hence its transference is abolished when hands, instruments, and dressings go to the patient fresh from sufficient immersion in an antiseptic solution. If hands, instruments, and dressings are surgically clean, they will not infect the patient, even though antiseptics be not used. But midwifery has often to be practised under conditions which make it difficult to be certain of surgical cleanliness; and therefore the additional safety which antiseptics give ought not to be despised and omitted.

The hands are the commonest poison bearers; and the parts to blame are the recesses not reached in an ordinary washing of the hands, viz., the folds about the nails, and the crevices of fancy rings. The poison may be carried direct from a puerperal fever patient, or a dead body, or a foul wound, to the puerpera; or it may be carried indirectly, the poisonous matter adhering to the dress of the doctor, midwife, or nurse, and being carried by the fingers from the dress to the patient. A midwife, who is often bending over patients, raising them in her arms, pressing against the bedclothes, lifting dirty linen, etc., can hardly help getting her dress soiled. If the dress is dark the stains are not seen, and when dry they are not felt. If such a dress be soiled with infective matter, the hands which touch it may carry the infective matter to the patient. If it be of durable material, it may be worn for years without being washed. Hence the rule that a midwife or monthly nurse should wear a dress of light colour and washable material adds to the safety of the patient as well as the appearance of the nurse. The doctor may carry infection in this way as well as the nurse; but his clothing is less likely to be soiled than hers.

Next to the hands come instruments. Forceps, catheter, syringe, if not carefully cleansed each time they are used, may carry infection. They ought not to do so, for by boiling they can easily be cleaned. Sponges, though dangerous, I do not think often give puerperal infection, for the sponge used is generally the patient's own toilet sponge, which has not been septically infected. But cheap second-hand sponges, or sponges used by a midwife for patient after patient, can only be made safe by most careful washing with soda, and soaking in a strong antiseptic solution.

These are, in my opinion, the modes in which puerperal fever is brought about in 99 cases out of 100, if not in more. There may be other rare modes of transference, but these are the common ones. The first line of investigation in searching for the cause of puerperal fever should be into the measures taken by doctor and nurse to ensure, first, cleanliness, and then disinfection, of hands, of clothing, and of instruments.

I need not adduce proof that puerperal fever is prevented by antiseptics, because the fact is beyond dispute, and must be known to everyone here. The object of this evening's meeting is not to repeat what we know, but to discuss what is doubtful.

Some who admit that puerperal fever is often caused by inoculation with septic poison, think that it may also be produced in other ways.

The views as to the origin of puerperal fever, which I shall consider more fully, are the following: (1) That the lying-in woman may poison herself; (2) That the inhalation of sewer gas causes a disease like septicæmia; (3) That contagion from erysipelas of the skin causes puerperal fever; (4) That contagion from scarlet fever causes in puerperal women a disease like septicæmia.

(1.) *"Auto-genetic" Puerperal Fever.*—Semmelweiss divided cases of puerperal fever into two classes, those infected from without and those self-infected. A great modern obstetrician has translated these terms into Greek and divided puerperal fevers into "Hetero-genetic" and "Auto-genetic." The use of these long words seems to me an instance of what the Duke of Argyll has called the "Fallacy of Capital Letters," the error, that is, of thinking that light has been thrown upon a question by giving something a new name.

This classification is delusive, because (*a*) this so called distinction, if it can be made, in no way affects prognosis or treatment; (*b*) if there be such a thing as "self-infection" with septic poison, we cannot in any way distinguish a self-infected case from one not so arising; (*c*) all our present knowledge goes to show that when antiseptics are efficiently used no such thing as "self-infection" occurs.

The cases which Semmelweiss thought instances of self-infection were simply cases in which the patients were inoculated with septic poison because the very rough antiseptic methods introduced by him failed.

Certain causes of auto-genetic puerperal fever have been specified. Some of them are conditions capable of producing slight febrile symptoms. But they exist equally in lying in hospitals in which antiseptics are used, and outside them. But when antiseptics are used the illnesses they produce are trivial, so that no one would apply to them he terrible name of puerperal fever.

Let me briefly review them—

1. *Errors in Diet.*—If a lying-in woman eats too much, is costive, and then takes an aperient, the irritation of the bowel so produced may cause slight febrile symptoms.

2. *Malaria.*—If this means paludism I submit that ague in a lying-in woman is ague, and not puerperal fever. The experience of those who

practice where ague prevails shows that when a pregnant woman suffers from ague, considerable improvement usually follows delivery, instead of an illness like puerperal fever.* If by malaria is understood merely bad air, I shall refer to the question subsequently.

3. *Chills.*—To the public a chill will explain almost anything. Peritonitis was long supposed to be caused by cold. But as morbid anatomy has advanced, the number of diseases for which "catching cold" could be accepted as a cause, has steadily diminished. What would now be thought of the judgment of a surgeon who should gravely say that peritonitis after ovariotomy, or septicæmia after an amputation, arose because the patient caught cold? I no more believe that cold can cause septicæmia after childbirth than that it can after an operation. In lying-in hospitals in which antiseptics are used, it is not found that open doors and windows, and the draughts resulting therefrom, produce any worse symptoms than muscular rheumatism, facial neuralgia, and similar minor troubles.

4. *Bad Hygienic Surroundings.*—This is a comprehensive term, which includes, among other things, want of antiseptic precautions, as well as other morbific agencies. An illness produced by bad hygienic surroundings can hardly be called "auto-genetic."

5. *Emotion.*—Emotional disturbance may produce rise of temperature. Dr. E. S. Tait† has shown that the characteristic feature of elevations of temperature from emotion is their short duration; the temperature runs up and runs down again within a few hours. Fretting on account of the disgrace of illegitimate motherhood has been invoked as an explanation of septic poisoning; but in lying-in hospitals in which antiseptics are properly used it is not found that there is any special mortality among unmarried mothers.

6. *The Strumous Diathesis.*—This is too vague for discussion.

In short, I do not believe that there is such a thing as auto-genetic puerperal fever, because the conditions which it is said produce such fever have been observed acting in hospitals in which antiseptics were properly used; and in such hospitals they only produce trivial illnesses.

(2.) *The Effect of Sewer Gas.*—The theory that sewer gas may produce an illness like septicæmia rests entirely upon one kind of evidence. That evidence consists of isolated cases, which seemed to be septicæmia, but were thought not to be, because the physician who reported the case (*a*) could not discover a definite source from which septic poison might have been carried to the patient, but (*b*) did find some drainage defect Now (*a*) the fact that the source of septic infection was not found does not disprove its existence. I take these cases to have been simply septicæmia, in which the source of infection was not found.

But (*b*) does poisoning with sewer gas produce septicæmia, or anything like it? What illness does sewer gas produce?

I can find little definite information as to the actual effects of sewer gas. The opinion of those who have given most attention to sanitary science seems to be that, to those who are seeking for causes of disease, sewer gas is a kind of "refuge for the destitute," to be invoked when nothing else can be found. The most definite statement bearing on the subject that I can find is in a report by Dr. Edward Ballard, on "effluvium nuisances."* He says, "It is worthy of remark and instructive, how constantly, in records of proceedings in courts of law, and as the result of my own individual inquiries, one particular group of symptoms is mentioned as the most prominent of those resulting from exposure to offensive trade effluvia, and how uniformly this group turns up, whatever difference there may be chemically, or as appreciable by the senses, in the nature of particular effluvia. This group consists of loss of appetite, nausea, sometimes diarrhœa, headache, giddiness, faintness, and a general sense of depression and malaise."

I have no doubt that sewer stinks may produce the symptoms described by Dr. Ballard in lying-in women as well as in other people. It has been said that sewer gas contains microbes which poison the patient. Mr. J. Parry Laws has investigated for the London County Council the bacteriology of sewer gas. He finds that the air of sewers contains rather fewer micro-organisms than the air outside, and that such micro-organisms as sewer gas does contain are related to those in the outside air, not to those in the sewage. The micro-organisms in the air, both inside and outside the sewers, are chiefly moulds and micro-cocci; those in the sewage mostly bacilli.

It has been said that "a woman who had lived in a poisonous atmosphere might be so impregnated with poisonous particles that after delivery her tissues would become a favourable breeding-ground for septic germs." Now if the tissues of any person could thus get "impregnated with poisonous particles," it would be those of the men who work in sewers. If sewer gas can produce septicæmia, cases of this or similar illness ought at least sometimes to occur among these men. Mr. A. C. Ranyard† has inquired. He finds that men who work in sewers, plunge their hands into offensive-looking sludge, give them a rub on their trousers or coat, and then eat their dinners without cleaning their nails or washing their hands in a disinfectant, are comparatively healthy, and, if anything, rather less subject to zymotic disease

* See Rodriguez dos Santos, Arch. de Tocol., 1889

† Obs'. Trans., Vol xxvi.

* Report of the Medical Officer to the Local Government Board for 1876, p. 118.

† *Knowledge*, March 1st, 1894, p. 58.

than their neighbours; and their children, who live at the outfall works, and spend a great deal of their playtime on the ventilating grids of the sewers, seem to be very healthy little creatures.

I know of no report as to the course of a number of lying-in women delivered where sewer stinks were present, but defended by antiseptics from septic poisoning. This is the kind of evidence we want, and until we have it opinions as to the effects of sewer gas on the lying-in can only be speculative.

Puerperal fever is one of several morbid conditions which, in the absence of knowledge, have been ascribed to defective drainage. I learn from an article by Dr. T. W. Thompson* that for years it was commonly believed that drainage defects, filth accumulations, and the like constituted the main causes of diphtheria. "Nevertheless, the knowledge gained more recently as to the natural history of diphtheria has largely tended to modify the belief in question." In the same article I find erysipelas ascribed to drainage defects, and a report, by Mr. J. Netten Radcliffe, on an outbreak of erysipelas in the Radcliffe Infirmary at Oxford, referred to as containing evidence that erysipelas may be produced by defective drainage. This is an instance worth quoting as showing the difficulty of the question, for the report seems to me to point to the opposite conclusion. Mr. Radcliffe† attributed the outbreak of erysipelas to impurity of the atmosphere from (*a*) laundry, (*b*) screening of ashes and house refuse, and (*c*) drains; and its prevalence to (1) continuance of the above hygienic faults, and (2) defective ward regulations. He recommended (1) removal of laundry, (2) alteration of ash-screening arrangements, (3) improved ventilation, (4) putting drains right, and, lastly, various improvements in the ward regulations. Now it is clear that the improvements in the ward regulations (isolation, disinfection, prevention of overcrowding, etc), advised by Mr. Radcliffe, could be carried out at once, and doubtless were, while the removal of the laundry and the ash-screening arrangement, and the putting the drains right required time. Nineteen days after Mr. Radcliffe's conclusions were submitted to the committee of management a great railway accident happened, and a large number of persons injured, some of them very seriously, were received into the wards within two or three hours. These patients were distributed wherever bed space could be found, without regard to the previous presence of erysipelas in the ward. During the whole time these patients were under treatment only one case of erysipelas occurred, and no other form of traumatic affection occurred among them. That is, the improved ward regulations were sufficient to practically stamp out the erysipelas, although the laundry, ash screening, and drains, which were supposed to be its cause, remained as before.

To my mind the evidence in favour of the production of septicæmia by the inhalation of sewer gas is as faulty as that formerly supposed to prove the dependence of diphtheria and erysipelas upon drainage defects. I believe that the inhalation of sewer gas causes the symptoms described by Dr. Ballard, and I can find no proof that it causes any other.

(3) *That Contagion from Erysipelas of the Skin produces Puerperal Fever.*—This is widely believed, for it is associated with the honoured name of Virchow, who has styled puerperal fever "erysipelas malignum internum."

Outside the puerperal state there are at least two conditions to which the name erysipelas is applied, viz., erysipelas of the skin, and erysipelas of the cellular tissue. These diseases are produced by micrococci. Some think that they are different forms of the same disease, differing much as a bad case of scarlet fever differs from a mild one. Others think that they are distinct morbid conditions produced by different micro-organisms. I hold the latter view. I do not doubt that the poison of spreading suppurative inflammation of cellular tissue, when brought into contact with puerperal wounds, produces spreading inflammation of the cellular tissue, quickly reaching the peritoneum and causing death. If spreading inflammation of the cellular tissue is "erysipelas," Virchow is right in calling one form of puerperal fever "erysipelas malignum internum." But erysipelas of the skin produces in the lying-in woman erysipelas of the skin, running the same course as in a patient not a puerpera, and no other illness.

As the latter opinion is not universally accepted, I ask leave to state my reasons for holding it. There are two kinds of evidence which support it: (1) bacteriological; (2) clinical.

1. *Bacteriological.*—Fehleisen has demonstrated that cutaneous erysipelas is due to a specific coccus, which can be cultivated outside the body, inoculated from cultures, and when inoculated produces cutaneous erysipelas, and nothing but cutaneous erysipelas. Unless Fehleisen's observations are either fabricated or vitiated by gross error, they are conclusive as to the fact that cutaneous erysipelas is a specific disease produced by a specific organism.

Fehleisen's conclusions have been doubted, because other observers have not been able to distinguish the erysipelas coccus from the streptococcus pyogenes, and have, therefore, said that there was no difference. I am not competent to argue this point, but I will quote one who is. Dr. Klein* "is confident that the name streptococcus pyogenes does not cover only one species, but is the

* Stevenson and Murphy's "Treatise on Hygiene and Public Health." Vol. II., p. 302.

† Report of the Medical Officer of the Local Government Board, 1876, p. 56.

* Stevenson and Murphy. Vol. II., p. 88.

name of a group of different species, varying in many details, though they all have a number of characters in common; only on close observation in the different media, and by the result of inoculation of animals, can these differences be made out. The streptococcus pyogenes obtained from acute phlegmon is most decidedly not the same as the streptococcus pyogenes which is obtained from chronic necrosis, it is not the same as that obtained by Fehleisen from erysipelas. . . . To say that because the streptococcus pyogenes of acute and chronic phlegmon is in its cultural characters extremely similar to the streptococcus erysipelatos, both are identical, would be illogical and contrary to clinical observation.

2. *Clinical.*—It is said that clinically, cutaneous erysipelas is interchangeable with the deeper, diffuse, suppurative inflammation of cellular tissue; that, therefore, inoculation of a lying in woman with the poison of cutaneous erysipelas may produce in her the rapidly spreading diffuse inflammation of cellular tissue; that puerperal fever and erysipelas coincide in time and place, both in lying-in institutions and among the population at large; that women in labour attended by doctors or midwives who were suffering themselves from erysipelas, or had come in contact with erysipelas patients, have taken puerperal fever; that doctors, midwives, nurses, and other individuals who come into close contact with puerperal fever patients suffer from erysipelas remarkably often; that the new-born infants of mothers with puerperal fever die of erysipelas in an unusually large ratio; that there is a close resemblance between the seasonal incidence and the mortality curves of the two diseases.

I grant that there is abundant evidence that puerperal fever and erysipelas prevail together. But this only shows that they flourish and spread under identical conditions. These conditions may be broadly described as uncleanliness, want of washing, want of antiseptic care, defective ventilation. They show the same seasonal curve, both diseases being slightly more frequent in the cold months than in the warm. The greater frequency is very slight, and is spread over about half the year. There is no such thing as an epidemic prevalence of either disease.

It does not follow that because similar conditions favour the spread of two diseases, or because one patient under these favourable conditions may have both diseases, that therefore they are identical or connected.

I am sure that lying-in women may have cutaneous erysipelas without septic poisoning. I have seen cutaneous erysipelas in lying-in women run the course usual in non-puerperal patients. I have even seen it affect the labia pudendi of a puerperal woman, and end in complete recovery without greater constitutional disturbance than is usual in this disease. I have seen it affect the newly born infant without the mother getting septicæmia. Dr. Hurry* (himself under the impression that it is established that "the same virus may provoke erysipelas and puerperal fever") has recorded, with surprise, a case in which a lying-in woman had erysipelas of the face without any symptom of sepsis. Gusserow† has reported cases of three kinds: (*a*) A patient taken in labour while suffering from erysipelas of the face; (*b*) a case of erysipelas of the face, beginning on the fourth day after delivery. The disease in these cases ran the same course as in anyone else, the condition in the pelvis not seeming to be in the least influenced by it; (*c*) cases of erysipelas of the skin with puerperal fever. These occurred during an epidemic in pre-antiseptic times. The erysipelas occurred in only a few isolated cases, and in every case in which it did occur the symptoms of septic poisoning preceded those of erysipelas. He concludes that there is not the slightest foundation for the view (which he calls an English idea) that erysipelas produces puerperal fever.

(4.) *That Contagion from Scarlatina Causes in Puerperal Women a Disease like Septicæmia.*—It has been said that zymotic diseases, when they affect puerperal women, get changed in their character, so that they cease to be recognisable by their proper symptoms. Scarlatina is the disease as to which this assertion has most frequently been made. The theory has been supported by the evidence of cases which presented the symptoms of septicæmia, but the source of infection with septic poison was not found, and it was therefore assumed that the disease was not septicæmia. If in such a case any exposure to scarlatinal infection could be traced, it was assumed that the apparent septicæmia was really an altered form of scarlatina.

The only evidence in favour of this hypothesis has consisted of cases of the kind just described in which the investigation started from the case, and inquired into past circumstances to find the cause, and assumed that septic infection was absent because its mode of conveyance was not found.

This theory has been, I think, shattered by the work of Boxall.‡ He observed the kind of illness that arose when scarlet fever was introduced into the General Lying-in Hospital. He found that scarlet fever presented the same symptoms, and ran the same course, as in women not in the puerperal state. The same thing has been observed by Meyer§ at Copenhagen. Meyer propounds the question, is the view correct that scarlet fever, communicated to a woman in labour or lying-in, may, and often does, present itself as a disease that has only a remote, or scarcely any resemblance

* Obst. Trans., Vol. xxxii., p. 312. † Arch. für. Gyn., Bd. xxv. ‡ Obst. Trans., Vol. xxx., 1888. § Zeit. für Geb. und Gyn., Bd. xiv.

to ordinary scarlatina, but a so much the greater resemblance to puerperal fever? His cases, 21 in number, arising in the course of an epidemic of scarlatina in the lying-in hospital at Copenhagen, afford him not the slightest ground for answering this question in the affirmative.

These observations show that scarlet fever produces in the lying-in woman scarlet fever of the ordinary type.

But Boxall goes further. The General Lying-in Hospital is one in which, as is well-known, the antiseptic rules enforced have had very good results: septicæmia having been banished for years. Boxall has averaged the amount of fever present in the hospital from all causes; before the introduction of scarlatina, after its disappearance, and during its prevalence. Now if scarlatina, besides producing scarlatina recognizable as scarlatina, produced anomalous forms of disease, not recognisable as scarlatina, it ought to have been the case, that after taking out the scarlatina cases, there was still a greater amount of fever of other kinds present in the hospital during the prevalence of scarlatina than before its introduction or after its disappearance. But it was not so. The fever rate of the hospital, other than that due to cases clearly recognizable as scarlatina, was not in the slightest degree raised during the prevalence of scarlatina within it.

To this I may add the fact pointed out by the late Dr. Matthews Duncan. If scarlatina produced puerperal septicæmia, an outbreak of scarlatina would bring with it an increase of puerperal mortality. Now many epidemics of scarlatina have been observed, but not one of them has ever been accompanied by a rise of the puerperal mortality.

Summary.—1. Puerperal fever is produced by micro-organisms, which get into the system through wounds made in child birth.

2. These organisms are transferred by contact; they are not inhaled or swallowed.

3. The transference of organisms is prevented by cleanliness, and the organisms are killed by antiseptics.

4. The hands are the usual poison bearers; next in frequency clothes and instruments.

5. Investigation of a particular outbreak of puerperal fever should begin with inquiry into the precautions taken by doctors, nurses, and midwives to secure the cleanliness and disinfection of their hands, clothes, and instruments.

6. There is no such thing as self-infection with puerperal fever. The causes supposed to produce "auto-genetic" puerperal fever, produce, in lying-in women defended by antiseptics from septic poisoning, only trivial illnesses.

7. The inhalation of sewer gas causes in the puerperal woman the same symptoms as in other persons; there is no good evidence that, in women defended by antiseptics from septic poisoning, it produces symptoms like those of septicæmia.

8. The poison of erysipelas of the skin produces in lying-in women erysipelas of the skin, and no other illness. But the poison of the disease known as phlegmonous erysipelas of cellular tissue produces puerperal fever.

9. The poison of scarlatina produces in the lying-in women scarlet fever and no other illness.

DISCUSSION.

Dr. WILLIAMS, of Baltimore, U.S.A., said he had listened to Dr. Herman's paper with very great interest, and agreed in almost everything he had said. He thought they would all admit that puerperal fever was a wound infection, and those who had studied the question had become more and more confirmed in that opinion. He would say that the general concensus of opinion was that it was a wound infection, that the organisms were brought to the woman without which she would not have puerperal fever. He took it to be very difficult to prove that a woman had puerperal fever from sewer gas. They would have to prove, for instance, that the woman had not been examined by anybody. The moment anybody examined her they had to admit the possibility that she might have been infected by contact, and as far as he knew very few medical men in this country or America attempted to attend labour cases without an examination of the woman. He thought those of them who attributed their cases to sewer gas had far better look to their own hands and the hands of their nurses. There was one question which Dr. Herman had not considered quite so fully as he would have liked, that was the question of auto-infection: the whole question was, of course, one of definition. If an absolutely healthy woman got puerperal fever they could only say that the infection had been brought from without, but there might be cases of women in abnormal conditions where it would be difficult to say whether the fever originated from organisms within or whether it was brought from without. He referred particularly to infection by the gonococcus, etc. He thought they must admit that in certain cases women might have fever from auto-infection, not from air or anything like that, but from organisms within them. The speaker went on to refer to the practice of douching, and condemned the routine practice of douching in normal cases. He thought that in private practice they would do far more harm by douching in all cases than in none. Referring to douching by nurses, he said he had had some cases where the nurse said, "I am very sorry doctor, but I have left my syringe at home, or I would have douched this woman before." He was always very glad she had left her syringe at home. It would probably be one she used for all purposes, and with that dirty instrument she would douche the woman; and if after that she got fever the doctor would have brought the infection. At home it was a matter of ten minutes for him to disinfect his hands. If he took less than that he did not feel satisfied. After ten minutes he felt positive that his hands were clean.

Dr. CULLINGWORTH expressed his concurrence in the decisions at which Dr. Herman had arrived. It would be known that Dr. Herman and he had stood side by side in a controversy as to the power of sewer gas to produce puerperal fever, and it would be known that they took practically the same view. He thought Dr. Herman had put his points very clearly before them. He had thrown down the challenge very boldly, and he wanted to hear some one take it up. If there was one point in Dr. Herman's paper which he thought might with advantage have been elaborated a little, it was the point which Dr. Williams referred to—viz., the question of auto-genesis. There were cases on record where patients after delivery had fever and died, and after death there had been found disease in the uterine appendages. These cases were probably instances of infection received by the patient *ante-partum*. He was glad Dr. Herman had called attention to the observations made by Mr. Laws for the London County Council. The County Council, he thought, might be congratulated on having taken the extremel

judicious step they had in instituting those inquiries, extending, he thought, over eighteen months, and conducted on a strictly scientific basis.

Dr. SYKES thought the Society was very much indebted to Dr. Herman, and the gentlemen who had followed him, for bringing this subject before them. He did not rise because he was very well acquainted with puerperal fever, but in order that he might enter his emphatic protest against the sweeping assertions which had been made as to the innocuousness of sewer gas, which he did with all due deference to the experiments made by Mr. Parry Laws and others. He ventured to say that none of them would assert that sewer gas was not the cause of some diseases, and it seemed to him that it might be the cause occasionally, he did not say frequently, of puerperal fever. There was an historical case on record, that of the Duchess of Connaught, at Bagshot Park. The Duchess was suffering from a form of septic poisoning, and the temperature fell when she was removed from a couch in a particular part of the room, rising again on her return there. It was ascertained that the couch stood near a door over which was a ventilator, giving communication with a disused cesspool. The question had been raised whether sewer gas could communicate any disease at all. Two cases had occurred within the last twenty-four hours in his district. Two children, in Gower Street, were sleeping in the bath-room, the bath being disused. A w.c. was in the room, also disused. Before they had been there three or four days they fell ill with sore throat, went to hospital, and were stated to be suffering from virulent diphtheria, from which disease they died. It was found that the trap of the w.c. was dry, and that sewer gas had free access into the room. In his district, at the Foundling Hospital, they had had an outbreak of typhoid; they all ate and drank in common, but only particular individuals got the disease, and those had been exposed to sewer gas fumes. In the same way, he thought it might communicate puerperal fever. The organisms of puerperal fever, he believed, flourished most under the conditions of dampness, darkness, and decomposition. In what place, he asked, did they get dampness, darkness, and decomposition more markedly than in sewer pipes? No one would state that puerperal fever was conveyed entirely by this means, it was merely that it might be so conveyed.

Dr. PARKES thought the question of whether puerperal fever was caused by what they commonly called sewer gas was one that would never be solved. It was impossible to prove it, and equally impossible to disprove it. Most medical officers would be inclined to say that at times it might be caused by bad sanitary conditions. He referred to an instance occurring in a large and highly-rented house where two women had died within a short time from puerperal fever—two wealthy ladies, who would, no doubt, be attended by medical men who would take the necessary steps for disinfection. On examination of the house an escape of sewer gas, which might probably have found its way into the bed-room, was found, and such cases might be multiplied. A somewhat similar case occurred in a hospital. A particular bed had got to be held as unlucky. He thought there were three cases which died, all from some sort of blood poisoning. On examination it was found that beneath, or close to, this bed there was a pipe connected with a cistern, the waste pipe of which was connected with an old brick sewer. If it was possible that patients could inhale disease in cases like this, was it not also possible that puerperal fever might be caused in a similar manner? He did not think Mr. Laws' statements could be held for very much. It was no use talking about organisms in sewer air not being more dangerous than in the outer air, because bacteriology was not yet in a state to completely recognise the organisms of disease. His own opinion was that under certain conditions sewer and other gases were extremely dangerous. He thought the lessons they should learn were that the medical man should take the utmost care of his own hands and instruments, and, secondly, that he should recognise his responsibility as to the condition of the drainage in the house of his patient.

Dr. WILLOUGHBY from his own experience supported the views taken by Dr. Sykes and Dr. Parkes.

Dr. HERMAN, in replying, said that by auto-infection he meant that the patient was infected herself, that she did not get the infection from without. He agreed with Dr. Williams that it was unwise for the douche to be used without special training and a proper tube. If the nurse could not be trusted to do it well, it had better be left altogether. With regard to sewer gas, he did not say it was innocuous quite, nor did he think so, nor did he deny that sewer gas might produce septicæmia. They could not prove a negative, nor did he try to do so. He only pointed out that it was difficult to prove that infection was caused by sewer gas. They had had some cases pointed out, but he did not call them good evidence; the best, he thought, was the one put before them by Dr. Parkes, when several patients died in the same bed in a hospital. If the number was large enough to exclude the possibility of coincidence, he should think that a very strong case of infection by sewer gas.

Dr. ARMSTRONG moved a vote of thanks to Dr. Herman for his paper, and to the visitors who had taken part in the discussion, which was put to the meeting and carried unanimously.

On the motion of Dr. SYKES, a vote of thanks was passed to Dr. Armstrong for his kindness in conveying to London and exhibiting and explaining the models he had shown them that evening.

PROCEEDINGS OF THE WEST OF ENGLAND AND SOUTH WALES BRANCH OF THE INCORPORATED SOCIETY OF MEDICAL OFFICERS OF HEALTH.

ON May 3rd a meeting of the branch was held at the Town Hall, Cardiff. Present: Drs. Walford, D. S. Davies, Sheen, Prichard, Patterson, Dowson, and Heaven.

After the minutes of the last meeting had been read and confirmed, the meeting had under consideration a letter from the secretaries of the Parent Society stating that the Council of the Society had referred certain questions to a sub-committee for consideration and report. The president and secretary of each branch were to be members of this sub-committee, and it was requested that the matters alluded to in the letter should be put before the branch in order that the branch representatives might come to the meeting of the sub-committee prepared with the opinion of the branch. The matters for the consideration of the sub committee were:—

1. The question of the representation on the Council of the Society of the branches and of members not attached to any branch.

2. Resolution of the Yorkshire Branch, "That matters of general interest and importance be referred to the branches before action upon them by the Incorporated Society."

3. The question of the payment of the expenses of the representatives attending meetings of the Council of the Society in London.

4. The question of including in the Fellowship of the Society medical officers holding appointments in the army, navy, and colonies, who are doing active sanitary work of a similar nature to

that which medical officers of health are performing in this country.

Each of the above questions was discussed, and the following resolutions were duly proposed, seconded, and carried:—

1. "That the Council of the Incorporated Society should, in the opinion of this meeting of the branch, consist of the officers of the society and representative members elected by each branch."

2. "That, in the opinion of this meeting of the branch, if the Council is a representative Council, as constituted above, the reference of matters to the branches for consideration be left to the Council's discretion."

3. "That, in the opinion of this meeting of the branch, the first-class railway fare of representatives attending Council meetings in London should be allowed."

4. "That, in the opinion of this meeting of the branch, such medical officers shall be eligible for the Fellowship of the Society."

With regard to the inquiry, contained in the letter, as to what day would best suit members of this branch for holding the ordinary meetings of the society in London, the opinion was generally expressed that a day towards the latter end of the week would be more convenient than one at the beginning.

Dr. PRICHARD proposed, and Dr. SHEEN seconded, the name of Dr. E. P. Evans, M.O.H., Mountain Ash, as a Fellow of the branch.

Dr. F. Stockwell, M.O.H., Wincanton, Somerset, having been duly proposed at the last meeting, was now elected a Fellow of the branch.

A paper on "Some Points in the Natural History of Small-pox" was then read by Dr. DOWSON.

SOME POINTS IN THE NATURAL HISTORY OF SMALL-POX.

By WALTER DOWSON, M.D.,
Assistant Medical Officer of Health, Bristol.

Small-pox suggests vaccination, but I do not propose to take up your time by proving for the thousandth time, by means of statistics drawn from our recent epidemic in Bristol, that inoculated cow-pox protects against small-pox. I would rather submit to your maturer judgment a few notes and considerations of my own, for which, disjointed and imperfect as they are, I feel it is unnecessary to apologise, for small pox is generally admitted to be a puzzle, and, so far as I am aware, there exists no generally accepted theory of the phenomena concerned in the production of this disease.

My only excuse for troubling you with a few crude thoughts on the subject is a very strong conviction of the importance of having a working theory, no matter how imperfect, provided it be the best obtainable, on every subject one has to deal with; always supposing that an observer is sufficiently unbiassed to avoid what is really very difficult to avoid, the squeezing of facts into theory, instead of the careful moulding and adaptation of theory to facts.

This consideration is, I take it, of especial importance to the medical officer of health, who, in dealing with dangerous communicable disease, has not only to take responsible public action in order to check an epidemic already in progress, but to bear in mind the desirability, or rather necessity, of extending our knowledge of these subjects, with the goal in view of preventing their recurrence altogether.

In the annual report for 1891 of the Medical Officer of Health for Bristol, a very interesting case of relapse in small-pox, one of the only two on record, I believe, is narrated by Dr. Paull, the medical attendant of the sanitary authority's hospital and an experienced observer:—

> A man, G. C., aged 28, was admitted on November 17th, 1887, suffering from small-pox. The eruption was well developed; the patient progressed favourably until November 24th, when the first symptoms again returned, a second crops of papules appeared, and the pocks again filled with pus, remaining out till December 11th, when they commenced to dry away. He ultimately made a good recovery, and was discharged cured on December 31st. This patient was said to have been unsuccessfully revaccinated.

A subsequent interview with the nurse who had charge of this case, brought out the additional facts that this relapse was associated with severe pain in the side, dyspnœa, and hoarseness. This leads me at once to my point, for there are many indications that the old term, zymotic, as applied to the acute infective fevers, is a misnomer. A blood zymosis, strictly comparable in character to the Torula fermentation—the process which, I believe, originally furnished the analogy for the application of the term, is probably incompatible with life.

We know already that in some of the diseases of this class, microbic growth and multiplication are more or less localised in certain organs and tissues—as, for example, malignant pustule, enteric fever, diphtheria, erysipelas—and probably the rest will be found to come into line with these. I propose at present to bring before you a few considerations tending to show that an attack of small-pox is the result of a specific bronchitis or broncho pneumonia, and afterwards to allude briefly to a few other considerations which have grown out of a somewhat close study of a recent epidemic of over 300 cases in Bristol.

One of the most striking features of an attack of small-pox is the constant severity of its onset symptoms, no matter what may be the subsequent development of the case. It is quite impossible to say from the character of the initial symptoms whether half-a-dozen papules are about to appear, the patient suddenly feeling quite well, and having no secondary fever; or whether the case will be modified, confluent, or hæmorrhagic, with almost certain death. This is

most remarkable, and the only facts in pathology at all conformable to it, so far as I am aware, are the initial symptoms of influenza and pneumonia. Ordinary catarrhs, too, are frequently associated with much the same group of symptoms, though not so severe. The objection at once presents itself, how is it, under this supposition, that an attack of small-pox is not, as a rule, characterised by the usual symptoms of bronchitis or pneumonia? Does not the absence of these put the theory out of court at once? This difficulty is not so insuperable as at first sight may appear. I need not remind you that in the early stage of pneumonia, cough is by means usual, and in the pneumonia of those who habitually take too much alcohol, the absence of all the usual symptoms of pneumonia is very striking. When one compares the conditions found post mortem in the lungs of those who die from small pox, with the result of getting a crumb down "the wrong way," the absence of cough in the one case, and its painful predominance in the other, form as sharp a contrast as can well be imagined. An adequate, and probably the true reason for this is that the absence of cough in small-pox is due to some injurious effect of the toxin elaborated by the microbe, upon the nerve endings in the affected parts, which renders the usual reflex action involved in the mechanism of this act impossible.

We infer, from the severity of small-pox in the unvaccinated, that the toxin is very virulent, and it is therefore probable that at the parts where the toxin is manufactured, and before it is diluted by entering the mass of the blood, its action is very marked. This is rendered more than merely probable by the clinical fact that in bad attacks, local paralysis may occur; paralysis of soft palate, pharynx, and muscles of larynx. The paralysis of the pharynx and of soft palate was very marked in a case of variola nigra, in a young woman of 25, admitted into the Bristol Sanitary Authority's Hospital in February last, where death took place on the sixth day. Post mortem—the following appearances were found:—

The soft palate and pharynx were occupied by a confluent crop of pustules. The whole of the interior of the larynx was superficially ulcerated, much congested, and presented numerous hæmorrhages. The epiglottis was black, raggedly and deeply ulcerated, and necrotic. In the œsophagus there were two oval pitted markings, with a long diameter of about half-an-inch, on the anterior wall where this is applied to the back of the larynx. The trachea at its upper part and at its bifurcation was extensively ulcerated, and there were patches of ulceration in both the primary bronchi. The bases of both lungs were congested. The right base contained an ill-defined consolidated mass about the size of a small fist, and merging gradually into the surrounding tissue. The brain and medulla were anæmic and very firm; the spleen, slightly enlarged, granular, and very soft. The Peyer's patches of the intestine were congested, but not ulcerated. Numerous sub-pleural and sub-peritoneal hæmorrhages were observed.

As my personal experience of the post-mortem conditions found in small-pox is limited to this one case, I will quote a few passages dealing with its pathology from Osler's system of medicine:—

"A section of a papule as it is passing into the vesicular stage shows, in the rete mucosum, close to the true skin, an area in which the cells are smooth, granular, and do not take the staining fluid. This represents a focus of coagulation-necrosis, due, according to Weigert, to the presence of micrococci. Around this area there is active inflammatory reaction, and in the vesicular stage the rete mucosum presents reticuli or spaces, which contain serum, leucocytes, and fibrin filaments. The central depression or umbilication corresponds to the area of primary necrosis. In the trachea and bronchi there may be ulcerated erosions, but true pocks, such as are seen on the skin, do not occur. There are no special lesions of the lungs, but congestion and broncho-pneumonia are very common. There is nothing special in the condition of the blood, and even in the most malignant cases there are no microscopical alterations." Under the head of complications it is stated that "Laryngitis may produce a fatal œdema of the glottis, and is liable to extend and involve the cartilages, producing necrosis."

Broncho-pneumonia is again referred to thus: "Broncho-pneumonia is indeed one of the most common complications, and is almost invariably present in fatal cases. Dealing with the neuroses, Dr. Osler continues, "Among the most interesting and serious complications are those pertaining to the nervous system." After enumerating the various conditions, the writer goes on to state that "the neuritis may, as in diphtheria, involve the larynx alone, or it may be multiple." We have had about half a-dozen cases showing this local paralysis, all of them confluent or hæmorrhagic, except one, a mild discrete case, in which difficulty of swallowing and speaking was very marked. The paralysis of the soft palate in this case was absolute.

The constancy of laryngitis is mentioned by Trousseau, and in thinking over the necrotic condition of the larynx in the above case, and its probable cause, namely, the toxin secreted by the microbe, it occurred to me that probably it is a difference of intensity of this necrotic power of the toxin which has to account for the great difference between an ordinary severe attack of the disease and a vaccination-modified attack. How the modification, caused by previous vaccination, is produced, is by no means apparent. If, however, we assume that as a result of the process, whatever it may be, the destructive action of the toxin

elaborated by the localised cultures is limited or absent in the modified cases; but in the ordinary severe cases is sufficiently intense to cause necrosis of small areas, which are subsequently separated by suppuration, we have an adequate explanation of the different degrees of intensity of attack and of subsequent pitting.

Small-pox so modified that no pustulation and no secondary fever occur may be called small-pox reduced to its lowest terms, or as our chief medical officer in Bristol likes to call it, small-pox with its teeth extracted. Inasmuch as such a modified attack is really variola—the term varioloid, meaning something which is not variola, but merely like variola, is incorrect—it is with this only that pneumonia need be compared; and the first point to which I would draw attention is the similarity of the febrile movement in the two diseases. The accompanying temperature chart of a case of modified small-pox, after Wunderlich, shows that the temperature comes down on about the fifth day, a movement very characteristic of pneumonia. Inserted along with this for the sake of comparison, is the temperature chart of an ordinary unmodified case, which affords a strong indication that there is, at this point, a natural break in the disease, the subsequent progress of the illness being very largely due to a secondary phenomenon, the disintegration and separation of the necrosed areas by suppuration.

With regard to the relation of skin eruption to a lung disease, the association of herpes with pneumonia is sufficiently common to be well known. I well remember a case where this eruption appeared on the buttock and to an extent almost sufficient to cover the part. The absence also of the usual physical signs of pneumonia by no means makes against the hypothesis. It is a well-recognised fact that the ordinary physical signs in pneumonia cannot sometimes be detected until several days have elapsed, and even then they may be very slight. In this connection it is worthy of mention, as a further point of resemblance between the two diseases, that in pneumonia there appears to be no well-defined and constant relation between the amount and character of the lesion in the lungs and the severity of the initial symptoms.

Hirsch* classifies pneumonia into ordinary sporadic cases, in the causation of which exposure to cold plays a prominent part, and infective pneumonia, of which he considers there is more than one kind. "... There can be," he says, "in my opinion, no question, after impartially weighing the facts before us, that pneumonia may be the expression of morbid processes acknowledging different causes, the clinical types also varying within certain limits."

In another part Hirsch continues: "Among the most characteristic and most uniform of the phenomena in this infective form of the disease is an unusually long prodromal stage, not like that of ordinary pneumonia, but such as may be observed in other infective diseases, the signs of the local affection (dulness, crepitation, etc.) being late in showing themselves, often as late as four to six days from the initial rigor. ... Post-mortem, the fibrinous exudation may be in lobular spots only, being often remarkably soft, and occasionally hæmorrhagic (corresponding to the dark reddish-brown sputa). ... The spleen is almost always swollen, sometimes also the liver; and there may be an affection of the kidneys, in which case albuminuria would have been observed during life. The mortality is very high."

The marked susceptibility of the negro to small-pox is well known, but it is, perhaps, not so widely recognised that he is also peculiarly susceptible to pneumonia. According to Hirsch, "the negroes in the upper basin of the Nile are greatly subject to it. ... By the writings of medical authorities in the United States ... it would appear that the preponderance of pneumonia there depends not a little on the large number of cases among the negroes." And again, "While the immigrants from Northern latitudes to subtropical regions enjoy a comparative immunity from inflammation of the lungs, the natives of the tropics, and most of all the negroes, are subject to the malady in quite a peculiar degree, not merely when they go to live in colder regions, but also within the countries of their birth."

Lest it may be considered that the hypothesis brought forward merely intensifies existing difficulties, by requiring an explanation of how a skin inoculation like vaccination could protect against a disease of the lungs, I adduce as evidence that no improbability attaches to it on this score, the well-known fact that in Australia cattle are protected against an infective and very fatal pleuro-pneumonia by an inoculation effected by passing a thread, soaked with lymph taken from the lung of an animal newly dead of the disease, through the skin of the tail. The "salting" of horses in parts of Africa, where protection against pleuro pneumonia is obtained by the result of bandaging a piece of diseased lung over a nick in the tail, provides another instance of the same kind.

The relation between small-pox and influenza at a certain stage is even more striking. It is impossible to diagnose between these two diseases, in many instances, on the second day of illness. Add to this that eruptions on the skin, erythematous or papular, may occur in influenza, and that the post-mortem appearances are very similar in kind and distribution, and the resemblance between the two diseases becomes very striking. The *British Medical Journal* of April 21st, 1894, contains an interesting communication, dealing with influenza, by Sir Peter Eade, in which the writer says: "The true influenzal lung affection would appear to be bronchitic ... it differs from ordinary

* "Geog. and Historical Path.," Vol. iii.

bronchitis in that the two lungs are very generally unequally affected." A few lines further down he makes the very interesting and important remark that "it has been noted that the right lung has, in the majority of cases, been more extensively affected than the left. May not this be due to the larger size of the opening at the tracheal division on the right side, allowing of a greater indraught of germ-carrying air, and so of a larger dose of the infective agent being introduced into the lung."

It certainly would appear that an unbiassed consideration of the symptoms and post-mortem appearances associated with an attack of small-pox warrants the provisional hypothesis that this disease is an infective bronchitis or broncho pneumonia, the primary local lesions in this situation being followed by a specific pyæmia characterised by metastatic foci in the skin.

A number of interesting considerations grow out of this view of the subject. In particular, it makes towards explaining the prevalence and spread of the disease in the winter months, when respiratory diseases are at a maximum, lung resistance at a minimum, and when people shut up windows and crowd round firesides for warmth and company.

An observation of Power's in 1884-5, that cases of small-pox in the surrounding districts followed the admission of acute cases in Fulham Hospital, and his conclusion, after a consideration of the circumstances, that diffusion only occurred when acute cases were aggregated, lends support to the view that the infective particles are contained in the expired air; as also does the fact, so far as my own experience goes, that secondary cases generally date from the early days of the disease before pustulation and scabbing occur in the primary case. Our own experience at the Bristol Sanitary Authority's Hospital confirms Power's observation; for diffusion has never occurred except when acute cases have occupied the wards. Infection by fomites certainly does occur, but this does not appear to be the ordinary method of spread.

The relation of small-pox to acne is a matter on which I should particularly like some information from the members present. Without exception, all the attacks in persons subject to acne, during the Bristol epidemic, have been very mild or trivial cases, and very difficult to diagnose, the rash in every case developing very slowly, and presenting a most puzzling absence of some of the distinctive characters. The mildness of the attack had, apparently, no relation to previous vaccination, the persons imperfectly vaccinated having been attacked quite as lightly as those well vaccinated. It would appear as though there were some real incompatibility between small-pox and acne. However, I merely put this as a question, our cases being too few to found an opinion upon.

It is stated in all the text books that a mild, quite as thoroughly as a severe attack, confers immunity against a subsequent attack. There is an altogether unnecessary air of mystery, it seems to me, in this manner of stating the commonly observed fact that some persons are not so susceptible as others, and that a mild attack in a refractory subject possesses the same protective value for that particular case as a severe attack in a susceptible person.

The recent epidemic in Bristol has afforded a striking illustration of the well-known and almost invariable circumstance that the decline of an epidemic is marked by a mitigation in the severity of the individual cases. Dividing our total of 325 cases into two equal parts, the first half contained under 15 per cent. of trivial cases, whereas the second half contained over 40 per cent. of trivial cases. The fact that small-pox epidemics so generally occur in winter, and disappear with the advent of fine weather, is apt to suggest that climatic conditions may have some effect in controlling the severity of the disease. But, as Hirsch shows, small-pox may be just as virulent in summer as in winter. On the other hand, with regard to the population, the soil in which the microbes grow, it is difficult to imagine that the periodic manifestations of some want of balance in the economy, vaguely ascribed to change of season, and indicated in spring and autumn by skin eruptions, and a feeling of being generally out of sorts, could exercise such an effect as to modify the growth of specific microbes in the tissues, though this possibly may happen.

I would offer a simple explanation of this preponderance of trivial cases during the decline of an epidemic, an explanation which, whatever may be its value, has the merit of being capable of general application. It is that communicable disease is, in the main, spread by means of the mild cases, a fact which in conjunction with an observation of M. Pasteur's on a particular method of attenuating the virus of fowl cholera, explains, I venture to think, what used to be called "change of type." M. Pasteur noticed that the longer a culture of the microbe of fowl cholera was allowed to grow, the less in proportion was virulence a property of secondary cultures taken from it, so that inoculations performed with a culture made from it in its early stage would kill a much larger percentage of animals than inoculations of a culture made from it at a later stage; and after a sufficient lapse of time the virulence disappears altogether.

Now, a process very similar to this may take place in the spread of infective disease. A mild case, often unrecognised, may, after possibly being kept at home for a day or two by the severity of the onset symptoms, be going about, performing daily work, and mixing freely with the community from the day on which the eruption appears. Infection not only takes place during the height of acute

stage—and here the chance comes in that, the case being mild, the microbe is already attenuated—but also at a time when, if the analogy afforded by M. Pasteur's observations holds good, attenuation has very probably taken place. It must be borne in mind that the life cycle of these organisms is probably very short, lasting perhaps a few minutes only, as has been shown to be the case in certain putrefactive microbes; so that the lapse of two or three days estimated biologically by generations would almost represent a geological period of ordinary time, and so afford ample time for variation. Moreover, having presumably the same circle of acquaintances as the other members of the family, such a case anticipates all or most of the possible infections by such of the latter as may contract the disease from it.

The severe cases are kept in bed, and as people are afraid of them, their striking power is limited to those who nurse them. If they are infective when they get about again, the attenuating effect of time comes in as for the mild cases. I have tabulated in genealogical chart form, the squares in dotted lines indicating houses, some of our complete groups, which show the operation of these trivial cases. They invariably stand at the head of a group, and if a leakage occurs, they are as surely the offenders.

Chart 1, on page 294, illustrates a typical instance of this. A married woman (A) had unrecognised small-pox, and infected her husband (B) and her daughter, aged six (C) This child's attack was also trivial and unrecognised until the father was removed to hospital. In the meantime she was attending school and visiting friends as usual, and had infected four people, one in the same house and three in different houses. Secondary cases again occurred, of which one affords a notable instance of the rule laid down. Case I. did not contract the disease from her husband (G), but from her sister-in-law (H), two completed fortnights after the removal of her husband to hospital. An instance like this not only demonstrates the necessity of rigid hospital isolation, but exposes its weak side, viz., the difficulty of getting hold of all the mild cases. The responsibility, moreover, of moving these mild cases to hospital when revaccination is refused, as it often is, cannot be treated lightly.

An observation of Sir Peter Eade's, previously referred to, suggesting that the larger section of the right bronchus might be the cause of the disease process attacking the right lung, leads to some curious and possibly important reflections. The fact that immunity from infective disease is associated, in many instances, with a difference in species in the animal attacked, is apt to suggest that immunity is related to some coarse specific difference in structure. A consideration of such a fact, however, as the striking difference of susceptibility to mouse septicæmia, in such very similar animals as field mice and house mice, at once negatives this view, which becomes still more modified by the consideration that quite as striking a difference is exhibited by individuals of the same species; great numbers of children, for instance, being insusceptible to scarlet fever. It looks as if it were possible that very small differences in the size, disposition, shape, cellular structure, etc., of certain organs or parts of organs, differences which may be hereditary, may exercise a selective action on the incidence of disease, hitherto unrecognised, and this, sometimes, in a purely mechanical manner.

For instance a number of microbes, just sufficient to infect one lung, would, if divided equally between the two, fail to establish themselves and set up disease. If it be the fact, and this is by no means improbable, that the relative size of the two openings of the primary bronchi is subject to variation, then this would probably exercise a selective action upon the incidence of infective disease of the lungs. At any rate this supposition illustrates the point I wish to bring out. The law of the correlated variation of structure deals with very minute differences, and often in a very curious and unexpected manner. A strain of human beings, with their power of propagating their like, having some minute anatomical peculiarity which lays them open to an attack of this or the other fatal infective disease, may be chiefly made up of the very people whom society can least spare. One has only to reflect that the mortality from scarlet fever may rise to over 30 per cent., and that of small-pox to over 50 per cent. to see what a powerful eliminating agent infective disease is; and until we know what kind of units are thus eliminated, it is a matter of the most urgent importance to mankind, that a community should have in its own hands, as soon as, and to the greatest extent possible, the control of such a force.

M. Pasteur finds an "explanation of the so-called spontaneous appearance of . . plagues," in the reflection that "an epidemic extinguished by an enfeeblement of its virus, can come to life again owing to its virus being strengthened by certain influences." . . . "Thus infectivity appears in a new light, which is in truth disquieting to humanity, unless, indeed, Nature in her evolution through ages past, has already met all the opportunities for the production of infectious or contagious maladies, which is exceedingly improbable."

The indication of a tendency to increase of diphtheria in densely-populated centres during recent years suggests itself as a case in point, especially as Thorne Thorne has shown that the introduction of slight and possibly unrecognised cases of this disease into schools is sometimes followed by cases exhibiting progressive development of virulence and infective power. This, to me, is by no means the least of the considerations which emphasise the folly of exposing children to an attack of infective disease in

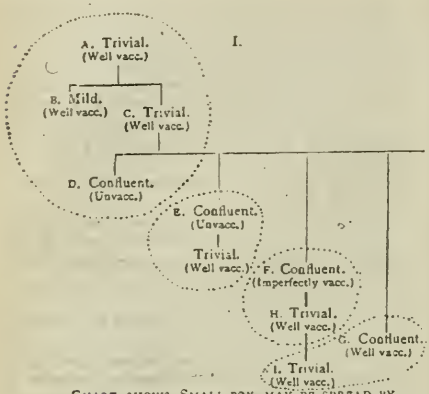


CHART SHOWS SMALL-POX MAY BE SPREAD BY TRIVIAL CASES.

The cases A and C were unrecognised, keeping about as usual during the whole of their attack. They were detected and bathed and disinfected when case B was removed to hospital.

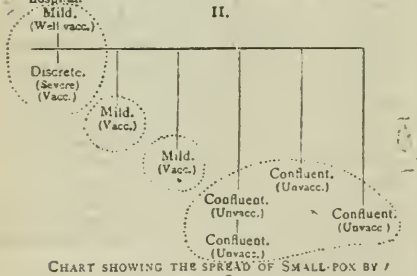
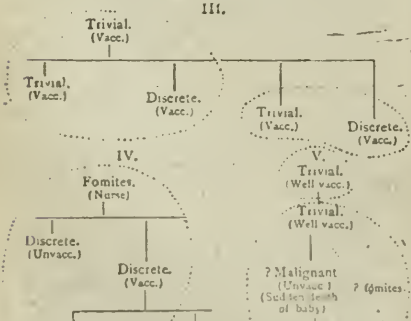


CHART SHOWING THE SPREAD OF SMALL-POX BY A MILD CASE.



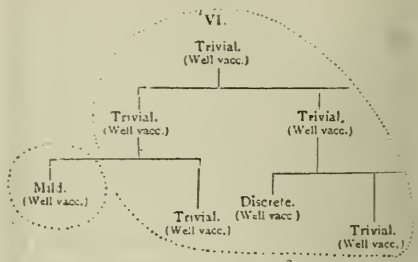
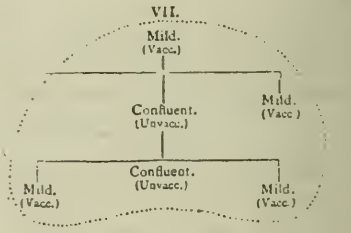


CHART SHOWING THE SPREAD OF SMALL-POX BY TRIVIAL CASES.



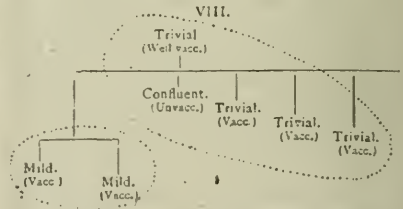


CHART SHOWING THE SPREAD OF SMALL-POX BY TRIVIAL CASES.

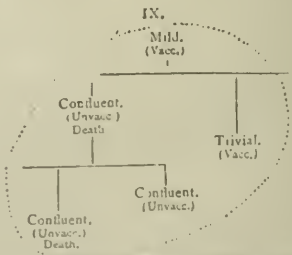


CHART SHOWING THE SPREAD OF SMALL-POX BY A MILD CASE.

order that they may contract it and "get done with it." Careful isolation not only saves life, but may ensure the survival of a life of priceless value. Of two children attacked, the one that dies may be a potential Shakespeare or Darwin, the survivor may have a cerebral organisation which destines him to the madhouse or the gallows.

Reconstruction of sewers and drains, certificated plumbing, pure water supply, increased air space, unadulterated food, unlimited application of soap and water, *et hoc genus omne*, these are very good, they are necessary preliminaries to a clear and unembarrassed statement of the final problem, which is essentially a biological problem. It is, however, by quite other means than "glorified plumbing" that this problem will be solved. In the meantime the medical officer of health, whose work is still generally supposed to have "something to do with drains," is, or should be in my view, one of the most potent of modern agents in bringing about that most desirable condition in which, in the words of De Chaumont, "Man as a race will hold his own destiny, and be able to choose between good and evil."

Discussion.

Dr. D. S. Davies remarked that in the recent epidemic in Bristol it was a notable feature that towards the close the cases became milder and milder, and were often extremely modified. In several cases, after a most marked onset, the disease practically aborted in a few days. But in the middle of the epidemic mild cases occurred side by side with very severe ones without intermediate cases. Possibly this might be due to the virus being of an extremely malignant type, causing very bad attacks in unprotected persons, and giving mild attacks to others whose protection was not quite absolute, the virus being strong enough to break down an almost perfect protection. He thought that attenuation in severity of attack towards the close of an epidemic might be due to some extent to the removal to hospital of severe or marked cases, the disease being left to spread by unrecognised mild cases.

Dr. Patterson thought the pneumonic origin theory of Dr. Dowson worth consideration. He suggested, however, that in enteric fever, for instance, there are laryngeal and pneumonic symptoms, as there may be in small-pox, and that in enteric fever, at all events, these might be due to absorption of the poison from the local lesion in the intestine. He further suggested that the mild type towards the end of an epidemic might be due to the exhaustion of good material for attack [suitable soil] leading to an attenuation of the virus.

Dr. Prichard failed to see why small-pox should be classed as an infectious pneumonia; pneumonic and laryngeal symptoms were common in most of the other infectious diseases. With regard to the severity or mildness of attack, he was of opinion that it depends very much upon the health of the patient, especially on the exposure of the person to the effects of deficient ventilation and bad air. He instanced cases of scarlet fever where deficient ventilation was apparently answerable for severe and fatal forms of the disease.

Dr. Sheen was of opinion that the cessation of an epidemic was due rather to exhaustion of suitable material than to attenuation of the virus. The fact that epidemics of measles occurred every few years as fresh suitable material arose rather bore this out. He had always considered that the severity of initial symptoms was a guide to the nature of the coming attack of small pox. He was rather surprised to hear that Dr. Dowson's experience negatived this.

Dr. Dowson, in reply, said that in Bristol, at all events, the cessation of the epidemic was not due to lack of suitable material, as there was still a very large field for its growth. With regard to the lung lesions of small-pox and enteric fever, he would point out that in the former they probably appeared early; but in the latter towards the end of the illness, the pneumonia being generally of a hypostatic character.

The President thanked Dr. Dowson for his paper, and the meeting then terminated.

The next meeting is to be held at Bristol at half-past four p.m., on Thursday, July 5th.

PROCEEDINGS OF THE NORTH-WESTERN BRANCH OF THE INCORPORATED SOCIETY OF MEDICAL OFFICERS OF HEALTH.

The annual meeting of this branch was held in the rooms of the Chemical Club, Manchester, on Friday, May 11th, at four p.m. The following members were present: Drs. Anderson (president), Armitage, Kenyon, Paget, Robertson, Tattersall, Vacher, and Wheatley.

The minutes of the last meeting were read and confirmed.

Letters were read from Drs. Barr, Fox, and Porter regretting their inability to be present.

A letter was read from the Secretary of the Sanitary Institute inviting two delegates to attend the autumn congress.

It was proposed by Dr. Paget, seconded by Dr. Armitage, and carried, that the treasurer and secretary be appointed as delegates to attend the Congress.

Dr. J. H. Crocker, Medical Officer of Health for Eccles, who was nominated at the last meeting, was duly elected a member.

The following nominations were read: Herbert Jones, L.R.C.S., D.P.H., Medical Officer of Health for Crewe, proposed by Dr. Vacher, and seconded by Dr. Kenyon; Mr. J. T. F. Bishop (as an associate), proposed by Dr. Paget, and seconded by Dr. Anderson.

The following paper was then read:—

Notes on the Softening of Towns' Water.

By J. Robertson, M.D., B.Sc., St. Helens.

The present notes refer to the subject of the hardness of towns waters only. In the case of villages, hamlets, and isolated houses there is usually very little opportunity of a choice provided the water is organically pure. Both surface and deep wells in some districts yield waters from 30 to 70 degrees of hardness, and these have to be used in the absence of soft waters for domestic purposes. Many arrangements and processes have been devised for softening water for individual houses, but up till quite recently few attempts have been made to reduce the hardness in the water supplied to large towns.

I therefore will, as briefly as possible, enumerate the various advantages of soft waters over hard ones, and then describe the process which is in operation at St. Helens for softening water.

In determining the suitability of a town's water supply as regards its hardness, two considerations stand prominently out. The first of these is the influence of the "hardness" directly on the health of man and animals; and the second is its influence on the various domestic and manufacturing processes in which water is used.

As regards the influence of "hardness" on the public health, most elaborate and searching inquiries have been made from time to time by the Rivers Pollution Commissioners, by the Royal Commission on Water Supply, and by various other high authorities.

The general findings in all cases are that hardness by itself has probably no influence on mortality statistics. It certainly is rather surprising that in nearly all these inquiries only the gross mortality rate was taken into consideration.

About two years ago I examined pretty carefully into the influence of "hardness" on certain diseases, such as rickets and urinary calculus, diseases which have been said to have had a causal relationship with the salts in water, and I found that, although it was quite impossible to give statistics of any value owing to the many complications which occur in such an investigation, yet there was no direct evidence that hardness had any influence on the mortality from these diseases. Glasgow, for instance, which formerly had a fairly hard water, and which changed to a water of one degree of "hardness," did not suffer by the change in any way, except that the very soft water took up at first some lead.

Many other instances could be quoted of extreme alterations in the hardness, producing no appreciable influence on the mortality from those diseases which have been supposed to be influenced by the water salts.

On the other hand, there is, I think, a pretty general concensus of opinion that certain hard waters do cause slight deviations from health. I have known cases where a dyspepsia was caused by drinking certain hard waters.

Hardness, as you are aware, is almost entirely due to carbonate and sulphate of lime or magnesia. I believe that a water containing sulphate of lime in large amounts is capable of giving rise to dyspepsia in certain persons much more readily than the carbonate. As regards magnesia hardness, very little is at present known as to its influence on man, when present in ordinary drinking water. It is one of the saline cathartics present in many mineral waters, and its presence in large amount in a drinking water should, I think, influence one's opinion as to the wholesomeness of the water.

Then there is ample evidence that certain hard waters do act injuriously on the skin, causing roughness and cracks and inflammatory conditions. It is to obviate this that so many "anticalcaires" are in the market, and are extensively used. In hard water districts rain water is collected for washing and other domestic purposes. This is often highly polluted, and there is a danger of this polluted water being used for drinking purposes.

It is of the greatest importance to have a soft water for nearly all other domestic purposes, and for manufacturing use. The prosperity of a town often depends on the softness of its water. Certain manufactures could not be carried on with a hard water. For cooking soft water is generally preferable, although for certain purposes (tea making and beer making) a hard one is generally desired.

For washing one degree of hardness represents approximately 10 grains of soap per gallon, and apart, therefore, from the fact of the difficulty of cleaning clothes with hard water, the saving in soap is considerable. This is often used as an argument in favour of spending money in obtaining a soft water, or of artificially softening the existing supply. In actual practice the saving of soap is very much less than the theoretical calculation would lead us to believe.

It was mainly on account of its manufactories that the Corporation of St. Helens adopted a scheme for softening water. Every degree of hardness reduces the solvent power of a water, and, therefore, in a town carrying on an extensive manufacture of crude chemicals it was important to have a soft water. Hard waters, moreover, "fur" boilers, causing great loss of heat, and give rise occasionally to boiler explosions. It is, therefore, almost essential for steam users to have a soft water. Many other advantages of soft water might be mentioned. Such waters are certainly to be recommended in manufacturing towns.

Another reason why a softening process was adopted at St. Helens was that the water contained small amounts of iron and manganese salts, so frequently present in water from deep wells in the red sandstone. These separated out in the mains and caused great annoyance when any alteration of pressure of the water in the mains was produced. People opened their taps and let off the yellow muddy water, thus causing great waste.

Four processes have been in use for softening water.

1. The Clark process, where lime water is added to fix the CO_2 in solution, and thereby cause the carbonate of lime to be precipitated. The separation of the precipitate is effected in a large reservoir by subsidence alone.

2. The Porter-Clark process. This is a modification of Clark's process, differing from it in so far that the deposit is separated by a filter press.

3. The Atkins-Clark process. Here the separation is effected by cloth filters.

4. Howatson's process, in which soda is added

instead of lime, and the deposit is removed by subsidence on screens and plates in a tall tower.

The Atkins-Clark process is the one adopted at St. Helens, and it is giving fairly good results. The special feature of this process is the method of separation of the precipitate of carbonate of lime.

The general arrangements of the works is shown in the diagram.

It is found that only very good qualities of lime can be profitably used. The lime is received in a house marked A on the diagram. It is placed at once in a lime slaking mill, which converts it into milk of lime.

This milk of lime is stored in a tank B.

From B the milk of lime is pumped into one of the three large lime cylinders C, where by the addition of water it is converted into clear lime water.

This lime water flows in measured quantities into the mixer D, where by means of baffle plates and a weir the lime water is thoroughly distributed through the water to be softened.

Whenever lime water comes in contact with water to be softened a white precipitate at once appears.

The mains from the various wells enter at E.

After leaving the mixer and passing over a "weir" the turbid water passes into a large covered reservoir F, where the larger part of the lime is deposited.

It then passes on to the filter house G, where it passes through stout canvas, and leaves the works clear and sparkling. The canvas filters are cleansed every five to ten hours by means of a strong spray of water, and each canvas lasts about one month. The filtering apparatus is of rather a complicated nature. The main feature, however, is that the milky water is allowed to filter through stout, specially-prepared canvas, stretched over 320 double circular zinc discs. No pressure is used in forcing the water through, other than its own weight.

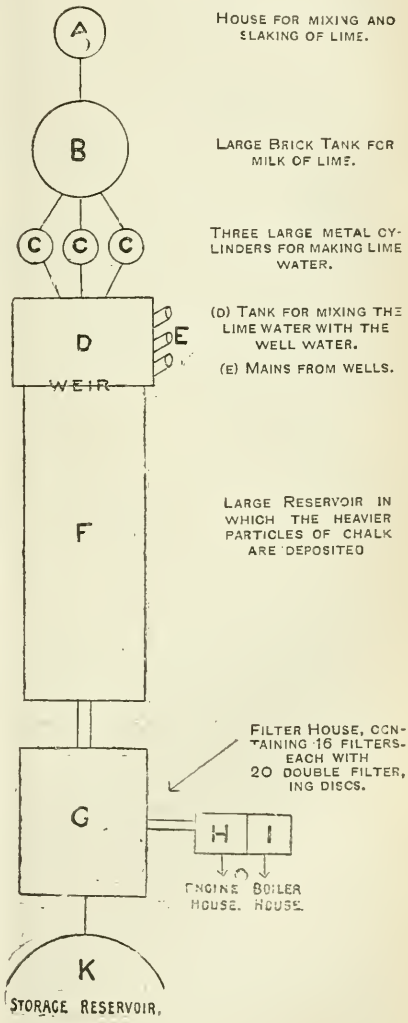
The daily average consumption of water in St. Helens during last year was 3,175,000 gallons, and of this quantity about 2,700,000 gallons of water were passed through the softening works daily.

The water supply of St. Helens is derived from five deep wells, tapping strata from 300 to 700 feet below the surface. Two of these wells supply water below 12 degrees hardness per gallon. The other three give water varying from 18 to 30 degrees of hardness.

Each of these waters react to the softening process, as shown by the following table:—

I.—Collins Green Water.	Degrees.
Mean hardness of 8 samples of unsoftened water ...	25·89
,, ,, 16 ,, softened ,, ...	11·70
Experimentally this water could be softened by lime to	8·6
Mean degrees of hardness removed	14·19

Diagram to show arrangement of Softening Works at St. Helens.



II.—Knowsley Water.

Mean hardness unsoftened (6 tests)	22·0
,, ,, softened (12 tests)	13·3
Possible to soften this by lime to	8·9
Mean degrees of hardness removed	8·7

III.—Kirkby Water.

Mean hardness unsoftened (6 tests)	18·4
,, ,, softened (13 tests)	9·5
Possible to soften this by lime to	7·0
Mean degrees of hardness removed	9·9

Samples have been taken daily or weekly since the works have been started, and it is found that the hardness has been reduced from an average of 24 to an average of 13 degrees.

The test used in determining the amount of lime water to be used is that of adding a few drops of decinomal nitrate of silver solution; if there is the minutest excess of lime water a yellow or brown precipitate is formed.

The price of softening the water at St. Helens has been 47d. per 1,000 gallons, but this amount may yet be reduced. This includes sinking fund and interest and all working expenses. The price of water has not had to be raised since the adoption of the water softening process.

A discussion then followed in which all the members present took part, and Dr. Robertson replied.

PROCEEDINGS OF THE YORKSHIRE BRANCH OF THE INCORPORATED SOCIETY OF MEDICAL OFFICERS OF HEALTH.

A meeting of the Yorkshire Branch of the Incorporated Society of Medical Officers of Health, was held in the Town Hall, Dewsbury, on Tuesday, April 10th, 1894. The following were present: The President (Dr. Whitelegge) in the chair, Drs. Deville, Watts, Littlejohn, Kaye, Hunter, Aston, Evans, Robinson, Ramsden, Buchanan, Burman, Williamson, Fisher, Hollings, Fairclough, Wade, Bond, Young, Higgins, Honeyburne, Moorhead, Rutherford, Johnstone, Forsyth, Pogson, and the Hon. Secretary (J. Wright Mason). There were also present as visitors: Alderman A. H. Pyrah (Mayor of Dewsbury), Alderman G. Clay (Chairman, Dewsbury Sanitary Committee), Councillors E. Kilburn and J. Walmsley (Members, Dewsbury Sanitary Committee), Mr. S. T. Tolson (Chairman of the Soothill Nether Local Board), Mr. C. B. Crawshaw (Chairman of the Scothill Upper Local Board), Mr. J. Thackray (Sanitary Inspector, Dewsbury), Mr. H. C. Marks (Borough Surveyor, Dewsbury), and Dr. Lee.

Previous to the meeting, the Mayor (Alderman A. H. Pyrah) entertained the members of the Society to luncheon, and extended to them a hearty welcome to Dewsbury. Until recently he was not aware that there was such a society in existence. He was very glad, however, that they had such a society, and thatsuch a large number of them could meet to consider and discuss from time to time important questions affecting the health of the people. He must say a word, and he would like to say it now. He supposed they visited different large boroughs; but wherever they paid a visit they would have a no more honest and hearty welcome and reception than they had that day in Dewsbury. They would be pleased to know that through the untiring work of the Sanitary Committee—of which Alderman Clay was chairman—coupled with the valuable services of their esteemed medical officer, the health of the borough was in a very satisfactory condition, and would, he felt sure, compare favourably with that of neighbouring towns, and he attributed that to the sanitary improvements which had been made. The Notification of Diseases Act had been in force in that borough since 1884. That Act was believed to be a good one from the first, but its full utility was not realised until their Infectious Diseases Hospital was erected, and that was done in 1889, five years ago, and it was enlarged in 1892, in order to meet an emergency. The Mansion House at the park was used for convalescent patients during that time. Their esteemed medical officer had under his charge about 500 cases of small-pox, out of which there were only 49 deaths. Their sewage works and farm were commenced about 1881, and since then a system of water closets had gradually replaced the old privies. Since 1887 they had erected about 631 such closets. The sewage farm was on what was known as the system of downward filtration. The farm had been visited and inspected by several corporations and sanitary authorities, and without exception every one had expressed the greatest satisfaction with the system, and some were erecting works on the same principle. The building of back-to-back houses had been prohibited. Their water supply was abundant, the quality was pure, and it was very gratifying to them to know that the whole of their reservoirs are, comparatively speaking, full. They had a full supply for five or six months to come. It would be gratifying to them to know that last year, although there was an exceptionally dry season, they had a full supply, and they never had occasion once to turn off the water. So that he thought with their good water supply and their excellent system of drainage and sewage filtration, they had every reason to feel proud, and were justly proud of the grand old borough of Dewsbury.

Letters of apology for non-attendance were read from Dr. Spottiswoode Cameron and Dr. Mitchell Wilson.

The minutes of the previous meeting were read and approved.

The new rules as revised by the Council were again submitted for the consideration of amendments. There were no amendments, and the rules were recommended for adoption at the annual meeting.

Communications received from the Central Society and the Birmingham and Midland Branch were read.

Resolved, "That the secretary give notice to the council of the branch of the proposed meeting of representatives of the various provincial branches to be held in Manchester, on Saturday, April 28th, and that all members of the council are invited to attend."

Resolved, "That the members of the Yorkshire Branch are of opinion that Saturday would be the most convenient day for the Society to hold their ordinary meetings in London."

A discussion on the following papers read at the Hull meeting then took place, viz. : "The Prevention of Infectious Diseases." Introduced by (1) Dr. Spottiswoode Cameron (Leeds), on "Methods of Disinfection, and extent to which it is desirable to go in dealing with different classes of disease." (2) Dr. Kaye (Huddersfield), on "Prevention of Infection amongst School Children." (3) Dr. Johnstone (Ilkley), on "Isolation at Home and in Hospital."

DISCUSSION.

Dr. T. DE VILLE (Harrogate) opened the discussion.

Dr. H. LITTLEJOHN (Sheffield) said Dr. Cameron's paper was an admirable one, as to the rules and regulations for disinfecting houses, but what struck him most about it was as to how far it was practicable. In his own town of Sheffield, where there were 20,000 acres to cover, it would be quite impossible to carry out the methods of Dr. Cameron, as laid down, and if it were possible it would be a most expensive system. He believed the system adopted in Sheffield was better than that of Dr. Kaye's for prevention of infection amongst school children, and was much simpler than that referred to, which entailed so many printed forms. With respect to Dr. Johnstone's paper, it was absolutely necessary that no charge should be made upon patients or their parents for their removal to an isolated hospital. Of course, if any patient required separate rooms or extra attendance a charge could be made, but on no condition should payment be made for infectious diseases.

Dr. J. H. BUCHANAN (Thirsk) asked how rural sanitary authorities were to keep down infection in their districts when they were not overburdened with wealth, and had not the means to provide a disinfecting apparatus or an isolation hospital.

Dr. W. F. WATTS (Dewsbury) said that the Dewsbury Sanitary Committee had had the question of disinfection under discussion a great deal during the recent epidemic, and for his own part in the majority of cases of infectious diseases, amongst the lower class, and in crowded populations, no expense was saved by their bedding or clothing going through the process of disinfection, and indeed people were far more likely to get rid of the fear of contamination by destroying the bedding, etc., altogether. In the end, to destroy the bedding and clothes was, in his opinion, the least expensive, and the most effectual way of dealing with the question. He was not at all certain about some of the systems of disinfecting being perfect, and so far as rags were concerned he regarded disinfection as useless. He certainly did not see that there could be any economy on the part of any town, whether they were presided over by board of guardians or otherwise, by putting up a small disinfecting apparatus. Small-pox was a loathsome disease, and everybody was in dread of it; but if they thought as much about scarlatina and measles, which caused ten times more deaths than small-pox, and took the necessary precautions, it would be better for everybody.

Dr. W. H. F. RAMSDEN (Saddleworth) spoke in favour of destroying clothing by burning them in infectious cases.

Dr. W. S. WADE (Wakefield) said his Corporation had put up a disinfecting apparatus, but not through his advocacy, but through the advocacy of others, who were not medical men. He was in favour of the burning process for stamping out the disease.

Dr. W. F. WATTS asked a question as to whether, after using bedding for a small pox patient, it could be permissible to use the same bedding for ordinary purposes after disinfection.

Dr. J. R. KAYE said he was an advocate of disinfection by steam. In Huddersfield they did not burn the bedding and clothes from houses where there had been infectious disease. They had had seventy-eight cases of small-pox in Huddersfield, and the bedding, etc., went through the process of disinfection, and in every single case it had acted well. Last year there were 576 scarlet fever cases, and in every instance the bedding, carpets, curtains, etc., were thoroughly disinfected.

Dr. A. EVANS said the compensation in Bradford would be enormous if they had to compensate people for the goods which were destroyed in a similar manner to Dewsbury.

Dr. J. P. ASTON pointed out the necessity of notifying the prevalence of any infectious disease as early as possible.

Dr. J. F. BOND, Dr. JOHNSTONE, Dr. HOLLINGS (Calverley), Dr. MASON (Hull), and the PRESIDENT continued the discussion.

The promised paper on "Slipshod Sanitation," by Dr. Hunter, Pudsey, was adjourned until the next meeting.

The meeting concluded with a vote of thanks to the Mayor for his kind reception and hospitality, and for granting the use of the Council Chamber for the purpose of holding the meeting.

At the conclusion of the meeting, the members of the Society were conducted over the corporation sewage farm by Mr. Councillor Burnley, Dr. Watts, and Mr. H. C. Marks, who explained to them the working of the system.

(End of Proceedings of the Incorporated Society of Medical Officers of Health.)

TRAMPS AND TYPHUS FEVER.—Dr. Ashby, in his annual report for Reading for 1893, gives an account of a local outbreak of typhus fever, in which there were altogether eighteen undoubted cases in ten houses, with six deaths. One of the deaths was at first attributed to nephritis, and another was stated to have been due to measles and encephalitis. "The disease first appeared in Coley, and was principally confined to that part, but I could not find out how the infection was introduced. I think it probable, however, that some person carrying infection must have passed through that part; and may possibly have caused the outbreak by entering a public house in Coley Passage, in which one of the earlier fatal cases happened. I ascertained from the weekly returns of notifications of infectious diseases, which I receive from the Local Government Board, that cases of typhus fever had been occurring in Cardiff for some weeks previously, and as that was the nearest place in which there was any record of the disease, I think it quite probable that some infected tramp may have passed through Reading from that town."

BUCKS MEDICAL OFFICERS OF HEALTH.

A MEETING of the Association of Medical Officers of Health in Bucks was held at Aylesbury on March 30th. The following were present: Messrs. Hooper, Sandell, Turner, Gruggen, the President (Dr. Phillpot), and the Secretary (Mr. De'Ath).

It was resolved that the next meeting of the Association be held on June 22nd, at High Wycombe.

Mr. DE'ATH proposed: "That an application be made to the Sanitary Committee of the County Council to appoint Dr. Phillpot to visit the district medical officers of health, and to report to the Sanitary Committee any matters of importance."

Dr. TURNER proposed as an amendment: "That the matter be left over till the next meeting, and that Mr. Verney, the chairman of the Sanitary Committee, should be asked to attend."

The proposition was then withdrawn and the amendment declared to be carried.

A discussion then took place on that part of the minutes of the last meeting which refer to isolation hospitals, and Mr. De'Ath's proposals with reference to that matter. It was decided that the County Council be urged to impress upon the district sanitary authorities the importance of the provision of isolation hospitals.

It was decided that Dr. Phillpot, as President of the Association, be asked to communicate with the clerks of the district sanitary authorities who have not adopted the Infectious Diseases Act, and to inform them as to the unanimous opinion of the association in favour of the adoption of the Act.

The following proposition was proposed by Dr. PHILLPOT and seconded by Dr. SANDELL, and carefully considered by the members present, namely: "That all sanitary authorities should communicate with the local secretaries of the Children's Country Holiday Association asking for certificates for freedom from infectious diseases of all children sent into their districts. That information should be given as to where the children are to be accommodated, and to state the wishes of this association that no children should be sent into the district until a certificate is received from the district medical officer of health as to the fitness of the proposed accommodation."

Dr. TURNER then introduced the subject of notification cards and submitted plans of cards, etc., by which the information with reference to the infectious diseases could be made more available throughout the country.

It was decided to ask Dr. Phillpot to communicate with the Sanitary Committee of the County Council on this matter.

Public Health.

ISOLATION HOSPITALS ON CHALK STRATA.

A RECENT inquiry held by inspectors of the Local Government Board bearing on the above question possesses considerable sanitary interest. This was in reference to an application by the joint hospital board for the districts covered by the Sutton and Carshalton Union of the Epsom R.S.A. for permission to borrow £2,500 for the purpose of purchasing eight acres of land on the border of Banstead Downs, whereon to erect an isolation hospital for infectious diseases.

At the inquiry it was stated that the nearest house to the proposed site was Banstead station, which was 1,370 feet away, and the next nearest were some cottages which were 1,400 feet away. The highest point of the site was 352·99 feet above ordnance datum, and the lowest 309·20. The surface was a light sandy loam and the subsoil was chalk. It was proposed to set 1½ acres of the site apart for the treatment of sewage by sub irrigation and intermittent filtration of all the sewage, except that from enteric fever patients. The latter would be cremated.

It transpired in evidence that the Local Government Board had declined to allow the Sutton Local Board to establish a cemetery on a site in the vicinity; but it was pointed out that the surface soil had powers in destroying pathogenic microbes which were not possessed by the subterranean chalk.

Dr. Jacob gave evidence that he, the medical officer of health of the district, considered the site an excellent one for a hospital both on account of its soil, its position, and its accessibility from all parts of the district. The sewage could, in his opinion, be best treated by irrigation and intermittent filtration; after it had passed through the soil it would go down, in an innocuous state, to the water level which was at least 100 feet below the surface of the ground. The sewage would not reach the chalk in its crude state. He had considered most carefully as to the possibility of contamination, and had given special attention to the water question. It was because he felt that the sewage could be treated well there and rendered innocuous that he recommended the site. There was a great difference between a cemetery and putting on the surface of the ground polluted water. The sewage of the South Metropolitan Schools, which contained 2,000 people, was dealt with by irrigation on two fields, and he had never heard any objection raised on the ground that the water supply might be injuriously affected. He considered it very conjectural that they were continuous or of any very great extent. He could not

conceive of fissures commencing on the surface and going right down for a hundred or two hundred feet and then two and a-half miles to the works of the Sutton Water Company. If the sewage passed through six or eight feet of chalk he believed that it would be robbed of all its noxious qualities. He was aware of cases where injurious matter had been conveyed long distances underground by water, and especially the Swiss case at Lausen.

Dr. Seaton, the county medical officer, gave corroborative evidence.

Mr. W. Whittaker, B.A., F.R.S, said a slight amount of water found its way through the pores of the chalk, another amount went along the beds of flints, but the greater amount, as far as they could find out, went along the lines of the fissures and joints. He thought it was extremely unlikely that any of the water would flow towards the water company's wells unless there was a remarkable fissure of which they had not the slightest evidence. He should not expect the cone of exhaustion of the Sutton Waterworks to extend to the site. Even if the water did get from there to the waterworks he should imagine that the risk of contamination was very slight indeed, seeing the vertical and horizontal distance it would have to travel. If the suggested objection to that site was a good one, it would not be possible to get a site for a hospital upon the chalk at all.

Mr. Baldwin Latham, C.E. (called in opposition to the scheme), stated that he was very well acquainted with the district, having known it for over thirty years. In 1875, in consequence of the fever epidemics at Croydon, he started, on his own responsibility, to make observations on the flow of the underground water in the district, and those observations had been continued from that time up to the present. He believed that the site which was proposed for the hospital was exactly on the dividing ridge of the Wandle and the Hog's Mill, and he had not the slightest doubt that if a hole were made there it would be found that the water found its way to the Sutton Waterworks. The chalk in the neighbourhood was very porous, and from his experience—from what he had known in other cases into which he had had to make inquiries—he should say that there was very considerable risk of there being fissures in the chalk along which impurities might be carried to the wells of the company. The witness described experiments which had been made at Beverley to prove that pollution travelled long distances underground, and continuing, said that, as regarded the hospital itself, he did not see any objection to its being placed upon the site proposed. The only question was as to the disposal of the drainage. He did not think it could be dealt with on that site without very considerable risk to the water supply of Sutton, in which would be included the water supply of the hospital. He should not be surprised if there were sand pipes on that site down which the water would flow very rapidly. He did not think there was as much risk of pollution from a cemetery as from a sewage farm, because in the former the process of disintegration went on very slowly indeed, and a large part of a body was water. He knew of fissures much longer than two miles and a-half, the distance from the proposed site to the waterworks. There was one which extended from the Brighton Road Valley to Carshalton Park, and was directly traceable. He was aware that it was proposed that the sewage should be treated upon the ground, which would deprive it of some of the noxious matter; but after taking everything into account, he was strongly of opinion that there was a risk in that case which ought not to be incurred, and which ought to be avoided.

Mr. Birch, C.E., agreed with Mr. Latham's views.

Other evidence having been given, the inquiry closed.

The inquiry, the scientific evidence in connection with which is summarised above, has important hygienic bearings, and the decision of the Local Government Board will be watched for with considerable interest. It is obviously desirable that chalk strata which contain and from which is derived a large supply of public drinking water should be protected from all possible sources of contamination. Chalk is extremely porous, and there is the further possibility of danger in connection with the fissures which frequently traverse the chalk. It involves, however, considerable strain on our credulity to imagine that even the most minute particles of enteric fever stools would make their way vertically through some hundred feet of chalk and then horizontally through two and a-half miles of chalk (or fissure) into the Sutton Company's drinking water. Mr. Baldwin Latham, who has for many years made observations and experiments on deep wells in these strata, thinks that this is possible. Such a statement, however well founded it may be, is not likely to receive credit and acceptance until the exact experiments on which it is based have been published and until these experiments have been successfully repeated. We trust that Mr. Baldwin Latham, in the interests of the public health, will publish any facts which bear on this important subject.

Provincial Meeting of the Society.—The arrangements for the annual provincial meeting of the Incorporated Society of Medical Officers of Health are not yet complete, but it is probable that it will be held on Saturday, June 30th. It has been suggested that the meeting should be held at Reading, where luncheon will be provided, and that the members and their friends (including ladies) should then go by steam-launch to Maidenhead and take tea. As soon as the arrangements are completed, a card stating the arrangements will be

posted to each member, and an early answer to this card is desired, stating the number who will attend, in order that the necessary arrangements may be made as to the launch, etc.

The Buda-Pesth Congress.—In the preliminary programme of the above congress which has just been issued we notice the following papers promised by members or associates of our society: The Relationship Between the Occurrence of Diphtheria and the Subsoil Water, by Mr. M. A. Adams; the Propagation of Typhoid Fever in Large Towns in Recent Times, by Mr. Shirley Murphy; the Provisions in London for the Removal and Treatment of Infectious Diseases, by Dr. W. R. Smith; Cholera, by Mr. Ernest Hart; the Alimentation of Labourers, by Dr. Thomas Oliver; the Housing of the Poorer Classes in and About Towns, by Mr. Locke Worthington; A Plea for Fish Inspection, by Mr. Lawrence-Hamilton; Protection of Dwelling-Houses Against Sewer Gas, by Dr. W. H. Corfield; Central Heating of Dwelling-houses and Whole Towns, by Sir Douglas Galton; Hygiene on Board Ship, with Particular Regard to Sailors and to Steerage Passengers, by Drs. H. E. Armstrong and W. Collingridge; Prevention of the Propagation of Tuberculosis, by Dr. T. W. Hime; on the Peculiarities of Urban Natality and Mortality, by Dr. W. Ogle.

Sir George Buchanan Testimonial.—Upon Sir George Buchanan's retirement from the post of Medical Officer to the Local Government Board, which he had held for over twelve years, his admirers deemed the occasion an appropriate one for presenting him with a testimonial in recognition of the admirable way in which he had performed the duties of his office, the excellent service he had rendered to preventive medicine, and the kindliness of character which had endeared him to all who had been brought in direct relation with him. A committee was formed, of which Sir Henry Acland was chairman, Dr. Bristowe treasurer, and Drs. Hamer and Thresh secretaries, and a sum of over £300 was raised. At Sir George's wish part has been expended on a die, and the remainder presented to the Royal Society, for the foundation of a gold medal, to be presented periodically by the Society to persons who, by their administrative ability or by original research, have rendered distinguished service to the cause of public health. On the 23rd inst. the officers above-mentioned met Sir George and Lady Buchanan at Dr. Bristowe's residence, and there presented Lady Buchanan with the first gold medal, and Sir George with a copy in bronze, together with an illuminated book containing a list of the subscribers to the fund. We hope in our next issue to be able to give the conditions upon which the Royal Society have accepted the responsibility of awarding the medal.

TESTIMONIALS TO MEDICAL OFFICERS OF HEALTH.

Dr. Taylor, late medical officer of health for Liverpool, on his retirement from the post which he has held for many years, received a gratifying testimony of the good-will and good-wishes of all his colleagues in the municipal service, in the form of an address, which was presented to him.

Dr. Reginald Dudfield before leaving Eastbourne for Paddington was made the recipient of an illuminated address, framed in oak, voted by the Town Council, and a very handsome and useful present subscribed for by his fellow officers under the corporation. The gathering, at which this presentation was made, included his Worship the Mayor (Alderman Keay), and almost the whole of the staff engaged at the Town Hall and elsewhere, every department being represented. The Mayor and Town Clerk of Eastbourne bore a high testimony to the thoroughness and faithfulness of Dr. Dudfield's work in Eastbourne, and wished him God speed in his future work.

The Marylebone Vestry, at a recent meeting, unanimously resolved to present a testimonial upon vellum, under seal of the vestry, to the medical officer of health, expressing the vestry's high appreciation of the services rendered by him in connection with the vestry's temporary hospital. The testimonial, on the motion of Sir E. Galsworthy, was worded as follows: "That this vestry on the occasion of the presentation of the final report of the Sanitary and Sewers Committee upon the working of the temporary hospital, provided by the vestry for the isolation of cases of scarlet fever and diphtheria occurring in the parish during the six months of the year 1893, when the accommodation at the hospitals of the Metropolitan Asylums Board was exhausted, desire to express their hearty appreciation of the valuable services rendered by their medical officer of health, Alexander Wynter Blyth, Esq., M.R.C.S., F.C.S., etc. The vestry fully concur in the opinion expressed by the committee that the success of the undertaking was mainly due to Mr. Wynter Blyth, who devoted his best energies to and put his whole heart into the hospital. In acting as the superintendent of the institution, he with great sacrifice throughout the exceptionally hot summer, attended personally to the innumerable details of the duties he voluntarily undertook, and the vestry hereby tender to him their best thanks for the very valuable services rendered by him, not only to the patients of the hospital, but to the parish of St. Marylebone generally."

In the *British Medical Journal* for May 5th, Dr. E. J. McWeeney gives an interesting account of a demonstration by him of the typhoid bacillus of Eberth in suspected drinking water by Parietti's method. In this method the growth of the more rapidly growing putrefactive (and gelatine liquefying) organisms is inhibited by the use of diluted phenol.

REPORT ON SANITARY LEGISLATION AND ADMINISTRATION IN ENGLAND.

An independent and "outside" view of English sanitation is difficult to obtain, and we therefore welcome the valuable report presented by Mr. H. N. Maclaurin to the Colonial Secretary for New South Wales.

The report commences with an historical sketch of the subject, which freshens in our memory the gratitude which all sanitarians owe to the impetus arising from actual and threatened epidemics of cholera. It also makes one remember that the public health service is an offshoot of the poor-law service; for it was the alarming growth of pauperism in England which gave rise to the passing of the Poor Law Amendment Act of 1834, and this was the indirect occasion of a new and more permanent interest in public health.

Following an able and detailed statement of the chief sanitary laws in England, we have a statement of the results of this legislation, so far as it can be shown, by a lowered general death-rate, and a lowered death-rate from special diseases. In the following summary there is much food for reflection:—

From a review of the facts which I have just stated, it will appear that the success of English sanitarians has been for the most part in the domain of diseases dependent on filthy surroundings and on contaminated water; while in the case of the more specifically infectious fevers results have been by no means so satisfactory. The reason is not far to seek. For years the actual administration of the public health laws was practically in the hands of persons who had no medical training, some of whom were imbued with notions as to contagion which were opposed to the best-known medical principles. Even now I feel bound to say that, great as is the influence of the accomplished medical officer of the Local Government Board, Dr. Thorne Thorne, I do not think that he and his colleagues occupy that position in the official hierarchy which their eminent abilities deserve and the public interest requires. But it is difficult to persuade people in England that anyone is competent to fill a prominent public office unless he be a politician or an unsuccessful barrister. Gentlemen of these professions, however great their capacity, seldom possess the training which is requisite for the vigorous superintendence of the public health. Hence, it results that while great attention has been paid to the removal of nuisances and to the supply of pure water, much less interest has been taken, till quite recently, in more purely medical measures devoted to the prevention of the spread of infection. It is to be hoped that the Act for the Notification of Infectious Diseases (1889), incomplete in some aspects as it undoubtedly is, will be so far effectual in remedying this defect.

Under the head of "Short comings of Sanitary Administration in England" Mr. Maclaurin has no difficulty in discovering the joints in our sanitary armour.

I. As regards enteric fever, he ascribes the comparative failure to reduce its mortality (particularly in the counties of Northumberland and Durham), (*a*) to the neglect of the local sanitary authorities, and (*b*) to the insufficient power of the central authority to compel the local authority to do its duty. A Cabinet Minister at the head of the central department has every political reason to induce him to refrain from doing his duty.

II. As regards the suppression of infectious diseases Mr. Maclaurin gives small-pox as an instance of defects of sanitary administration. The defects are summarised as follows:—

1. The notification required by the Infectious Diseases Notification Act is insufficient, as it is not necessary to notify cases of doubtful diagnosis; in this way mild but infectious cases of varioloid may readily escape attention under the mistaken idea that they are only chicken-pox. In New South Wales the Act, which unfortunately is restricted to small-pox, requires that householders and medical practitioners should forthwith report every case which may be reasonably supposed to be small-pox. The responsibility for dealing with it then rests with the Health Department, which has, I think wisely, always acted on the principle that in cases of doubt it is best to secure the public safety even at the expense of a little private inconvenience.

2. The Notification Act is comparatively recent; its application by local authorities is optional; and local authorities who have adopted it do not yet seem to be, in all cases, sufficiently impressed with its importance to insure its being vigorously enforced.

3. There are no statutory powers of compulsory isolation, excepting under a magistrate's order, which naturally entails considerable delay; and even when such an order has been obtained the patient cannot be compelled to obey it. The only course open to the authority in such a case is to wait till the patient is sufficiently recovered to be brought before the magistrate, when he may be fined for disobedience. By this process I suppose the majesty of the law is sufficiently vindicated, but it can hardly be said that the spread of infection is satisfactorily prevented.

4. In many places the provision for isolation of infectious diseases is insufficient; in some a part of the workhouse is used for this purpose, a practice which late experience has shown to be quite unsuited for coping with an outbreak of small-pox. In London the accommodation provided by the Metropolitan Asylums Board is exceedingly good, but scarcely large enough for dealing with a severe outbreak. The Board have been much impeded in their efforts to extend their accommodation by the opposition of the Middlesex County Council.

5. No provision is made for the isolation and inspection of suspected cases of small-pox; no patient can be admitted to a place of isolation in London until the eruption has declared itself, even although it may be morally certain that he is suffering from the initiatory fever of the disease.

III. In respect to the importation of disease from abroad, the following deficiencies of the existing law are enumerated:—

There are, however, many deficiencies in the existing law which throw unnecessary difficulties in the way of these gentlemen, and which might be supplied without causing any appreciable inconvenience to the trading or travelling public:—

1. Power should be taken to proclaim infected ports or places, so that port medical officers should have authoritative information as to what ships it is necessary to board and inspect. I believe that no such general information is at present given.

2. All ships sailing from or having touched at infected ports should be obliged to hoist a distinguishing flag on arrival, and they should be required to anchor for inspection before being allowed to enter the inner and more crowded part of the port.

3. The port medical officer should have power to detain a suspected ship for a reasonable time to enable him to form a correct opinion as to her sanitary condition. For example, he should not be required to inspect a ship after nightfall; the ship might be detained till daylight, so that she should

not escape from efficient inspection by arriving between sunset and sunrise.

4. Vessels arriving from infected ports should be regarded as infected and prevented from communicating with the shore till the port medical officer has either declared that they are not infected or taken steps to remove any source of infection that he may find existing on board.

5. No vessel arriving from an infected port should be permitted to discharge fresh water, whether carried as ballast or for the use of the crew and passengers, into the harbour.

6. Masters of ships arriving from infected ports should be required to answer all questions of the port medical officer with reference to the ship, the voyage, the crew, and the passengers. Refusing to answer or giving false answers should be punished with great severity.

BERI-BERI.—Dr. J. A. Lynch, Customs Medical Officer for Chinkiang, China, reports that, "Cases of beri-beri are met with every summer, though the disease does not seem to be very widely prevalent. Both the 'wet,' or acute, and the 'dry,' or chronic, forms are found. There is an impression, I think, that only adults suffer from this disease; but three fatal cases, which I saw in the summer of 1889, were all in children under twelve years of age. The symptoms of this curious malady form a perfect clinical picture of multiple neuritis. There is little room for doubt that its essential cause is a specific micro organism."

IMPROVEMENT SCHEMES AT BIRMINGHAM.—Dr. A. Hill, M.O.H. for Birmingham, has made an official representation concerning two unhealthy areas in the city. The first contains an area of 6,160 square yards, and comprises 68 houses; the second contains an area of 4,030 square yards, with 65 dwelling-houses. The defects of the two areas are thus summarised by Dr. Hill:—

(1) Bad arrangement or distribution of the buildings over the areas, causing the dwellings in most cases to be crowded, but sometimes waste of land surface. (2) Houses back to back. (3) Yards unpaved, sodden with filth, or pavement and gutters defective. (4) Houses and wash-houses more or less dilapidated as to roofs, walls, floors, and sinks. (5) Walls and floors damp from absence of damp-courses in the walls, and from the floors being of porous quarries in direct contact with the damp ground; also from defective roofs admitting rain. (6) Obstructive buildings.

The Council only passed a portion of the scheme of the Improvements Committee for dealing with these areas. In reading the report of the discussion in the City Council, it is obvious that serious misapprehensions existed, which were not cleared up by other members of the City Council. The stock argument appeared to be that if the condition of the areas was so bad, the owners should be compelled to put their property into habitable condition. A glance at the plans accompanying the report refutes this contention. No amount of repairs will convert back-to-back into through ventilated houses. The City Council have to thank their short-sighted predecessors for allowing houses to be so huddled together, and it is now for them to undo the evil done by a former generation of city councillors.

THE PAST, PRESENT, AND FUTURE OF THE MEDICAL OFFICER OF HEALTH.

By A. JASPER ANDERSON, M.A., M.B., Medical Officer of Health for Blackpool.

(Read at the April Meeting of the North-Western Branch of the Incorporated Society of Medical Officers of Health).

AFTER thanking the branch for his election as President, and alluding to the flourishing condition of the branch, Dr. ANDERSON spoke in appreciative terms of Dr. Welch, a former president of the branch of medical officers of health for Blackpool.

History of the M.O.H.—The office is one of comparatively recent formation. In 1831, by an Order in Council, a board of health was established "to prepare and digest rules and regulations to guard against the introduction and spread of infection, and to purify any ship or house in case any contagious disorder should unhappily break out therein." This board consisted of the President and six Fellows of the Royal College of Physicians, London, five members of the Government of the day, and a Fellow of the College of Physicians as secretary. This board subsequently recommended the formation of a local board of health at each place, consisting of the chief magistrate, the clergyman, one or more medical gentlemen, and two or three of the principal inhabitants, who were, as occasion required, to correspond with the board in London. This order was passed in dread of the cholera, and is one of the many instances in which the fear of that disease has been a blessing in disguise.

> There is a soul of goodness in things evil,
> Would men observingly distil it out.

However, the cholera visited England in 1831 and 1832, and the medical members of these boards appear to have done their best in dealing with the disease when it had appeared, but no adequate preventive measures were taken. We may regard these gentlemen as the prototypes of the present medical officers of health.

In 1837 the Births and Deaths Registration Act was passed, an enactment which we may regard as the fundamental one for all future sanitary work. Sanitation seems to have remained stationary until 1846, when several Acts were passed to carry out the valuable recommendations of the Health of Towns Commissioners. One of these recommendations was that the local administrative body have power to appoint, subject to the approval of the Crown, a medical officer properly qualified, to inspect and report periodically upon the sanitary condition of the town or district, to ascertain the true causes of disease and death, more especially of epidemics increasing the rates of mortality and the circumstances which originate and maintain such diseases, and injuriously affect the public health of such town or populous district. When another severe epidemic of cholera was threaten-

ing, the Public Health Act, 1848 was passed. By this Act the General Board of Health was established, consisting of the First Commissioner of H.M. Woods and Forests as president, and two other persons, one of whom was to have a salary. The gentleman appointed to the latter post was that well-known sanitary reformer Edwin Chadwick. The board was supplied with a secretary and clerks to superintend the execution of the Act. The board was only appointed for five years. Great indignation was felt at the time in that there was no medical member of the board, but by the Nuisance Removal and Disease Prevention Act of the same session, a medical member (Dr. Southwood Smith) was attached to the board for the purposes of the latter Act alone.

By the Public Health Act 1848 it was enacted that the local board of health *may*, if they think fit, appoint a fit and proper person, being a legally qualified medical practitioner or a member of the medical profession, to be the officer of health, and to perform such duties as the general board may direct. This is not the first instance of the creation of the office of officer of health, for section 12 of the Towns Improvement Clauses Act, 1847 enabled the Commissioners to appoint a person of competent skill and experience, who shall be styled the officer of health. I may mention that section 37 of the 1848 Act made the appointment of an inspector of nuisances compulsory. The General Board of Health became very unpopular and, as a consequence, in 1854 its constitution was altered, so as to be analogous to the Poor Law Board, which consisted of a president with a salary, capable of sitting in the House of Commons, the Secretaries of State, and the President and Vice-President of the Board of Trade. It was appointed for one year, and in 1855 was empowered to appoint a medical council and medical officer. The latter provision only was exercised, Mr Simon being appointed. In 1858 the powers vested in the General Board of Health were transferred to the Privy Council. By the passage of the Medical Act of 1858 the medical profession was at last placed on a proper legal basis, and thus improved its status. The Public Health Act of 1848 was a decidedly useful measure, but failed in some respects because of the permissive character of many of its clauses, and especially that with regard to the appointment of medical officers of health. In 1871 the Local Government Board was constituted. Many sanitary Acts were passed between 1848 and 1872 which I need not stop to particularise, until in 1872 every sanitary authority was required to appoint a medical officer of health who was to be a legally qualified medical practitioner. The Public Health Act (1875) codified with slight amendments previous Acts. The duties of medical officers of health, as laid down by the Local Government Board, are very wide and wisely, I think, somewhat vague in some particulars. These you are all familiar with. As a result of the creation of a large number of such officers, the need of special courses of training and examinations to test their knowledge was felt, and so various bodies began to institute courses of lectures and grant diplomas with that object. We see from his duties that a medical officer of health was expected to be acquainted with physics, chemistry, geology, and meteorology; to be somewhat of a sanitary engineer; to know something of building construction, offensive processes of trade, and the inspection of food; to be skilled in the etiology of disease, especially of epidemic diseases, and in the management and construction of hospitals; and further, to possess a knowledge of the diseases of animals in relation to those of man, with an intimate acquaintance with sanitary law and various bye-laws. To these executive duties others have been, and are being continually added by a succession of legislative measures, *e.g.*, the Food and Drugs Acts, the Rivers Pollution Acts, Canal Boats Act, various Factory Acts, Dairies, Cowsheds, and Milkshop Orders, Housing of the Working Classes Acts, the Notification of Disease Act, the Infectious Disease (Prevention) Act, and the Public Health Amendment Act, 1890. The three latter Acts, which are adoptive, have immensely helped the medical officer of health in the execution of his duties, and though they have been largely adopted, the time has now arrived, in my opinion, to make them compulsory.

By the Local Government Act, 1888, the Council of any county may appoint one or more medical officers of health. Although this is only permissive, and not obligatory, it has been largely adopted. The appointment is not necessarily to be whole time. The medical officer of health of a county or county district or a combination of such districts, or his deputy, must be qualified in medicine, surgery, and midwifery, unless in special cases the Local Government Board allow otherwise. But in all districts whose population at the last census was over 50,000 no person can be appointed medical officer of health unless he holds the above qualifications and be registered as a holder of a diploma in sanitary science, with certain exceptions specified in the Act. These appointments to county councils are being gradually filled up, although in certain cases there appears to be a tendency to pay a small sum for a report upon the annual reports which are transmitted by medical officers of health in the county to the County Council. The last Local Government Act, 1894, does not, I think, make any difference in the position of medical officer of health, except in so far as alterations in the boundaries of existing districts may occur. So much for the history of the office.

At present we have county councils with medical officers of health devoting their whole time to

the duties of the office; others, where a small sum yearly is paid for a report to some gentleman who may or may not hold another appointment as medical officer of health; and others where no medical officer of health has been appointed; and in one case (Cornwall) the work is done gratuitously by the chairman of the Sanitary Committee.

Tenure of Appointments.—We have county boroughs with medical officers of health debarred from other duties, and others where they are in private practice, and are paid an inadequate salary for the duties they perform. In those instances were private practice is not allowed there is a tendency to tack on to it other offices, police surgeon, and borough analyst, duties which scarcely fall in the same category. Further, there are smaller urban and rural sanitary authorities which have either combined into larger districts so as to pay a whole time officer, or which have in each instance appointed their own officer. From the "Medical Directory" of 1894 I find that there are about 392 rural sanitary districts with separate medical officers of health, 123 which have combined amongst themselves and with urban districts, and 55 districts which have further subdivided themselves into two, three, or four sub-districts, with a medical officer of health for each sub-district. There are about 903 separate urban districts, and 90 which have entered into combination. The above-mentioned 123 rural districts and 90 urban districts have formed 37 combined districts, with the same number of medical officers of health. The salaries and tenure of these offices as given in a return made in 1888, and published in PUBLIC HEALTH, December, 1893, was alluded to. In comparing the population, acreage, and salary given to the medical officer of health one comes across a mass of incongruities, and sees at once that there is no relation between the work required to be done and the salary given. In fact, we may take it that when the salary is placed at a low figure, the medical officer of health is expected to act only as a recording angel, to prophesy smooth things for the future, and that if he be an enthusiastic and zealous sanitarian he will either be ignored or told to mind his own business. To turn for a moment to the tenure of such offices. This is as unsatisfactory as the salary. In most of the smaller districts the authority diminishes the general district rate by accepting half the salary from the County Council fund, and though the authority appoints the officer, the Local Government Board exercises a veto on the appointment and on the discharge, but the appointment is made for a certain period, most usually for one year. If during his term of office the officer has displeased a section of the authority, although he may only have conscientiously carried out the duties prescribed for him by Act of Parliament, he may be turned adrift, and any interference from the central authority prevented by paying the whole salary, and perhaps a reduced one from the rates, as occurred the other day at Lytham to one of our own members. I maintain that all such officers ought to be appointed during good conduct and capacity for performing the duties, and that no one should be discharged before a definite charge of neglect of duty has been brought and proved against him. In county boroughs officers are as a rule appointed permanently or "at pleasure," and cases like I have mentioned do not often occur. I know that it occurred in one instance at Bradford, but here the medical officer had been appointed for five years. In smaller districts I am distinctly of opinion that the medical officer of health should not be at the mercy of his authority, and I should like to see him placed under the control of a central authority. With the present tendency to decentralisation I cannot see any chance of getting these appointments made by the Local Government Board, but I do not see why the County Council should not be given power after due inquiry to compulsorily group districts with an officer devoting his whole time to the duties thereof appointed for each group. Further, the authority or combined authority should have the power of selecting two or three candidates for the post of medical officer of health, of whom the County Council would appoint one. This would give a man who knew the locality and people a chance of being appointed and prevent an obnoxious person being thrust upon the authority.

In London, under the Public Health (London) Act, 1891, the Local Government Board and County Council have interfered effectively with regard to the salaries of medical officers of health. If there is to be any improvement in the sanitary medical service in the provinces I am sure that some reforms must be made both as to salary and tenure, for though money is not everything, and perhaps an enthusiast looks last of all at his salary, yet the labourer is worthy of his hire, and the estimation of his work and the value placed upon his opinion and position depend in this workaday world on the salary he is being paid. At the same time, it ought to be compulsory for all future holders of the position to be in possession of a diploma in sanitary science.

Nascitur non fit does not apply to a medical officer of health. It is an office which requires experience, and I think that means ought to be found to train a younger generation to succeed those who are gradually dropping out of the forefront of the fight. This could be done by having assistants to the medical officers of large districts. Even a large place like Manchester has to be contented with one medical officer, and to get over the difficulties we have sanitary inspectors carrying out duties which can only be properly performed by medical men.

Prospective Reforms.—I have no doubt that in the future many reforms will be passed which will increase the duties and responsibilities of

the medical officer. Some of those which appear to me most pressing I will now briefly allude to. The subject I should place first would be that of death certification and the reform of the office of coroner. Not to enter into too much detail, I should say that no dead person should be buried unless a certificate has been given by a medical man as to the *fact* and cause of death. In those cases which are at present buried as "uncertified" strict inquiries ought to be made by a medical man known as a public certifier, who would preferably be the medical officer of health of the district, or in large districts a medical man assisting him, who would have to report and be responsible to him. That where necessary a post-mortem be made by him, and in cases of suspected foul play, after an informal inquiry by the public certifier, a public one be held before a magistrate. This would mean the abolition of the present office of coroner, which I now consider to be an anachronism. Such reforms would hasten the adoption of cremation in place of our present insanitary system of burial.

Secondly, reforms are required to be made in the present system of vaccination, and whilst not interfering with the arrangement of public vaccinators, yet the returns ought to be sent to the medical officer of health and the Acts administered by the sanitary authority.

Thirdly, the time has arrived when the Public Health Acts ought to be again codified, and amendments which have been found requisite introduced. In addition to those mentioned above with regard to the medical officer of health, I should like to draw your attention to a few:—

I. Various improvements in the legislation with regard to common lodging-houses. In this connection I may mention that at the present time I think the Local Government Board have power to deal with the dissemination of disease by vagrants without the passing of further legislation by putting into force sections 130 and 134 of the Public Health Act, 1875. Thus section 130 reads, "The Local Government Board may from time to time make, alter, and revoke such regulations as to the said Board may seem fit, with a view to the treatment of persons affected with cholera or any other epidemic, endemic, or infectious disease, and preventing the spread of cholera or such other diseases as well on the seas, rivers . . . as on land." Section 134 reads, "Whenever any part of England appears to be threatened with or is affected by any formidable epidemic, endemic, or infectious disease, the Local Government Board may make . . . . regulations for all or any of the following purposes: (1) . . . . (2) . . . . and (3) for the provision of medical aid and accommodation, for the promotion of cleansing, ventilation, and disinfection, and for guarding against the spread of disease."

At the present time surely small-pox is an epidemic disease and threatens to become a formidable epidemic, and regulations under these sections ought to be made. They have been made for cholera, why not for small-pox? Under them the sanitary authority might have power, amongst others, to detain in quarantine and to disinfect the inhabitants of common lodging-houses and vagrants in either the whole of England or in certain specified areas. Under such regulations a system of registration of tramps might be instituted with the issue of a ticket bearing a few marks of identity on a modified Bertillon system to prevent their transference.

At the present time we have the anomaly o persons from such places who possibly have the germs of the disease incubating in their bodies, wandering at large about the country in spite of all persuasion, whilst whole districts are proscribed because of swine fever, and a pig cannot be moved from one part of the country to another without any number of licenses, precautions, and formalities. Truly, in England property is of immensely more value than human life.

II. More adequate methods of dealing with nuisances are required. In the first place the word "dangerous" requires to be inserted in the nuisance clause, so that it may read a nuisance, or dangerous or injurious to health. The medical officer of health and sanitary inspector should have power to give a legal notice for the summary abatement of a nuisance and for non-compliance therewith power to issue a summons. and if the case be substantiated before a court of summary jurisdiction a fine should be imposed for each day the owner has allowed the nuisance to continue after legal notice has been given him. If after a period specified by the court the nuisance remains unabated, then the sanitary authority should be empowered to carry out the work required and charge the owner with the cost thereof.

I need not specify to you the long delays that are incurred in getting to business with a refractory owner of insanitary property. Having to prove the case before the court will prevent a person suffering from any arbitrary action on the part of the sanitary officials, and especially so if the case is heard by some of the great unpaid.

In the future, infectious diseases like small-pox and scarlet fever will be more difficult to deal with, owing to populations arising who are neither rendered partially immune by heredity nor by previous attacks of the disease. So that, whenever the disease does slip into a locality, it is likely to develop into a formidable epidemic unless a perfect system of dealing with such diseases is in force. The system of notification requires to be improved, and for this purpose greater facilities should be given medical students in the clinical study of infectious diseases; and, seeing that these cases are now isolated in special hospitals, attendance upon patients in such hospitals should be insisted upon before a diploma to practise is

granted. Power to compulsorily remove to hospital a person suffering from any dangerous infectious disorder, who cannot be properly isolated in the house occupied by him, should be given.

Another subject which has come under my notice is that of dwellers in vans and tents, such as gipsies. In this case bye-laws can be made under the Housing of the Working Classes Act, 1885, but additional powers are wanted to prevent them being disseminators of disease by having such vans registered, by the isolation of persons suffering from infectious disease within them, and by the detention for cleansing and disinfection of such infected vans.

Again, the Education Acts and payment by average attendance are acting as potent means for the spread of infectious diseases by sweeping children into schools whilst suffering from the infectious diseases in early stages, or from infected houses. This could be prevented in a great measure if in any case where a child is kept away under the certificate of the medical officer of health all its possible attendances during that time were counted as having been made.

Inspection of our food supply is at present in a very unsatisfactory state, and a more perfect system must be elaborated before the public can be said to be adequately protected against unsound food. Thus with regard to meat, public slaughter-houses may be erected, and regulations for the inspection of carcases and viscera made, and yet the members of the trade of whom we have most reason to be suspicious will defeat all this by providing slaughter-houses in country districts outside the boundary.

Race Degeneration from Sanitary Efforts.—A subject which I cannot pass over without mention is this. Are our efforts as medical officers of health to check the spread of infectious diseases and the occurrence of other diseases leading to degeneration of the human race? This is a reproach which is constantly being brought against us, and especially by reactionary individuals in our separate localities; but latterly it has been broached in an unexpected quarter, namely, by Dr. Haycraft, in the Milroy lectures. He looks upon phthisis as one of the greatest race-improvers, and hence this branch, which has been a pioneer in taking more active measures against the second factor of its production, viz., the infective agent itself, is put upon its defence. Let me put his arguments before you shortly. Agreeing with Galton and Weismann as to the non-transmission from parent to offspring of purely locally acquired characters, he yet admits that any acquired constitutional change of the parent may react through the blood stream on the germ cells existing in the body, so as to alter them and cause them to develop differently than they would have otherwise done. Admitting that immunity to disease acquired by parent is to some extent transmitted to offspring, *e.g.*, small-pox and measles behave differently among races where the diseases have been prevalent from those where not, he explains this in what he considers a better way by those individuals who survive, having more combative phagocytes, and hence in several generations the pathogenic microbes will have exercised a selective influence on the human race. He considers it unnecessary to assume that the germ cells are affected by the constitutional symptoms produced by measles, small-pox, chicken-pox, scarlet fever, typhus fever, and typhoid fever. "During an attack, for instance, of measles, although life or death may depend chiefly on the power of the phagocytes to resist and destroy the microbes, any concomitant weakness may decide the case, so that these diseases, to a certain extent, are race-improvers, inasmuch as they prevent a larger number of weak than of strong children from growing to maturity and contributing to the production of the next generation." How about the cases that do not die? Are they not weakened and left more degenerate members of society? Does not blindness result after some cases of small-pox and measles, deafness after scarlet fever and measles, and chest affections and even consumption after measles and whooping cough. I cannot conceive why we are to give these microbes unlimited power to kill off the weakly members, for in that process we shall cause as many, if not more, defective examples of humanity to be produced. To include the microbe of typhoid fever is singularly unhappy. The disease affects more especially male members of the community in their most productive period of life, when their services are of most use to the State. Leprosy is regarded as a friend to humanity, since it attacks fever, starved, and ill-nourished districts. On the other hand, syphilis is regarded as inimical to race progress. With regard to phthisis, the argument is that the phthisical type is hereditary, that persons thereof are of attractive personal appearance, easily marry, and are very fertile; and that, as a consequence, any method of excluding the bacilli will perpetuate and extend this type. Here, again, are we powerless to prevent the formation of this type by providing healthy dwellings, free from dampness, well-ventilated and well-lighted, by the plentiful provision of good food, by cleanliness of the skin and healthy exercise, and by the erection of healthy workshops. It appears to me that he places unnecessary stress upon the fact that the bacillus only attacks unhealthy human tissues, and that the disease is always inherited, in so far as predisposition thereto is concerned. I am sure that I have met with numerous cases of pulmonary phthisis where it has been acquired by unhealthy occupations and faulty hygienic surroundings in people not of the phthisical type. He denies that, because the average period of life has increased that there is, as a consequence, greater robustness

of constitution, but maintains that race-decay has been produced because the death-rates of those living in the higher decades of life have increased, and that this degeneration will continue if other selective agencies are not introduced to take the place of those which sanitation is removing. However, he has not the courage of his convictions to suggest that we shall arrest our present methods until the other selective agencies—segregation of criminals, abolition of marriage amongst those affected with phthisical taint or insane tendency, etc., have been introduced.

Vaccination, which from his point of view is preventing the action of a race-improver, small-pox, is not even mentioned; and, to be logical, I should expect him to suggest its abolition. I think that the selective agencies mentioned by Dr. Haycraft are not lost sight of. Attempts are made to educate the public on these subjects, and I think that this subject of constitutional taint is being increasingly considered in arranging marriages. Any further measures at present would only lead to immorality, with its attendant evils. The thorny subject of dealing with syphilis I have not time nor inclination to enter upon. The segregation of criminals is to some extent enforced at present. Many crimes are committed through force of circumstances, and are atoned by the punishment meted out, but crimes committed by those of the criminal type are so habitual, and of such a nature that they mostly pass their whole lifetime in prison. It seems to me that to ascribe any degeneracy of the race, if it exists, to public health and social measures keeping the weakly-born alive to manhood is a very short-sighted and superficial method of looking at a complicated social problem. Are there not many factors besides these which are acting and interacting in a manner prejudicial to health? We know there is a rush from the country to the town, a tendency for people to crowd together on limited areas, to lead more bustling and irregular lives, and to meet with more severe competition in their daily life. The value of the products of the human race is not to be measured in muscle substance alone, and we know from history that many men who have enriched the stores of human knowledge would not have lived had such Spartan-like doctrines prevailed. However, gentlemen, I do not see that we need to think of resigning our positions and betaking ourselves to more fruitful fields of labour, nor to be deflected in the slightest from the path which we have taken.

A Lesson to Vestrymen.—A member of the Sanitary Committee of St. Saviour's Board of Works, Southwark, has been summoned for having a house in so dilapidated a condition as to be unfit for human habitation. The magistrate ordered the premises to be closed, and exacted the substantial penalty of £20 from the landlord.

SEWAGE FED "FISH."

By J. Lawrence-Hamilton, M.R.C.S.

Many seaports and coast towns have their local sewage outfalls placed too near the shallow shore, especially where the tide recedes to a considerable distance.

Towns situated in a bay require additionally lengthened outfalls into the sea, so as to prevent certain local winds blowing the diluted sewage matter back on to the beach, shore, across bathing places, and thence offensive sewage smells into the town.

Definition.

"Fish" includes amphibian and aquatic animals.

Warmth and Sewage Liked by "Fish."

Chemical and bio-chemical causes, conditions, and circumstances, including the heat evolved by putrefactive changes, make the sewage warmer than the local sea water into which it flows. Most aquatic and amphibian animals are attracted by warmth.

Professor Edwin Linton noticed chubs (*Lenciscus attarius*) and suckers (*Catostomus ardens*) swimming in a warm branch at 95° F. of a local river, into which a mountain stream, having a temperature of 48° F., discharged itself, making the mingled waters 55° F.

The trout avoided the warm stream and kept to the cold water, but the chubs and suckers—even when a big net was placed behind them—declined to enter the colder streams.

Phosphorescence.

Although sewage is rich in phosphates, up to date I have been unable to learn that phosphorescence is relatively more common about sewage outfalls than elsewhere. Or, in other words, the numerous species of aquatic and amphibian animals, parasites, and bacteria which are capable of becoming phosphorescent, do not seem to specially favour or frequent the neighbourhood of sewage outfalls.

If this be the case, perhaps such water is either too impure a media for excessive phosphorescent life, or else the local aquatic plants absorb all available excess of phosphates.

Darwin thought that phosphorescence was decomposed organic particles, purifying the ocean.

When at Aalesund, in Northern Norway, rowing at night time about its harbour, as our oars struck the water, great beautiful pools of phosphorescent "fire" were remarkably plain.

In and about the waters of this seaport much fish refuse and dead fish would probably find their way, which evidently did not diminish the local phosphorescent animal life.

Those who are anxious to learn about animals, plants, and substances which can become phosphorescent, will find an excellent summary thereon in *Chambers' Encyclopædia*, under the article

headed "Phosphorescence" (Vol. VIII., published in 1891).

Slaughter-house Refuse in Sewers.

From low-classed private slaughter-houses, diseased animal abominations are sometimes surreptitiously sneaked into the local drain, whence this filth travels through the town sewers and the outfall into the sea or river. Such offensive curiosities as the possession of a long length of diseased intestines (which are also used as sausage skins) may be seen hotly disputed for by a score or more of sea gulls, each of which pulls at the prize, even though swarming with parasites, putrefactive and pathogenic bacteria.

Sewage is Oily and Alkaline.

Owing to its grease and oil, together with its warmth and alkalinity, sewage discharging into the sea may make manifold long, oily stretches or spaces of smooth, diluted sewage water float for miles around and about the local outfall. Or, in other words, liquid sewage is warmer and of less specific gravity than the salt water, which may be calmed by the excess of oil, grease, and soapy materials derived from sewage.

This sewage "oil" is blown by the wind, borne by the tide, or carried by currents. During stormy surf seas, or big breakers near the shore, this, as other oily and soapy matter, has usually no appreciative effect in calming the troubled waters.

Other Oily Streaks on the Sea.

The more or less offensive stale oily patches, derived from sewage, floating on the water are smelt and distinguished by experienced fishermen, and still more readily by the keener scent of "fish," from the fresh, fine, oily, and greasy streaks often made at the sea's surface by large shoals of mackerel, pilchards, herrings, manhaden, etc. According to the fisherman-naturalist, Mr. Matthias Dunn, of Mevagissey, surface frequenting "fish"—including porpoises, porbeagle-sharks, dolphins, and the like—see, scent, or feel these oily streaks, which they make for from long distances.

In the wake of steamers, especially those worked by screw, besides the mechanical action of churning the water, the smoothed path is apt to contain some oil from the machinery, together with greasy

Bilge Water,

which often closely resembles sewage.

Whilst whales, salmon, and trout avoid oily and sewage matter, many other aquatic and amphibian animals used for our food delight in such media.

Petroleum, creosote, and similar substances are fatal to fish and fisheries. The leakages from the petroleum ships on the Volga are ruining the Astrakan sturgeon and sturgeon caviare industries.

Animal Parasites in Sewage-fed "Fish."

Sewage-fed "fish" are particularly prone to be loaded with animal parasites and their eggs, which may develop a further stage within their consumers.

Lord Byron, in his "Don Juan" (v. 149), alluded to the Turkish plan of feeding "fish" on human corpses:—

> If now and then there happen'd a slight slip,
> Little was heard of crimioat or crime;
> * * * * *
> The sack and sea soon settled all in time.
> * * * * *
> The public knew no more than does this rhyme;
> No scandals made the daily press a curse—
> Moral's were better, and the fish no worse.

Sentiment set aside, it is surely quite as revolting to eat sewage fed "fish" as it is to eat aquatic and amphibian animals which have recently preyed upon human corpses.

Sewage outfalls into the sea are frequented by flocks of sea birds, whose guano, infected with animal parasites and their eggs, mix with the sea-borne sewage containing animal and vegetable town filth and refuse, including parasitic worms and their eggs, derived from man as well as from food animals slaughtered in the district. Because at sewage outfalls marine life is abundant; hence both sea birds and fishing vessels frequent such spots, where aquatic vegetation is often specially luxuriant, because of the local warmth and materials derivable from sewage.

"Fish" Life in Sewage Waters.

Though a certain proportion of sewage is liked by "fish," if in too great quantities it would be fatal to the life of aquatic and amphibian animals.

From time immemorial the Chinese have fed their carp on human excrement, whose salts have been previously extracted by water.

Cod, turbot, sprats, herrings, pilchards, oysters, clams, limpets, periwinkles, mussels, sea anemones, scallops, lobsters, crabs, and the like are fond of sewage-fed waters in moderate amounts; whilst grey mullet, eels, tench, and carp can thrive and revel in much more filth-polluted waters.

Sewage-fed "Fish" as Food.

As fish are eaten without the consumer knowing whence they may have been procured, it is absolutely necessary to bleed them before blood clotting, immediately gut, and thoroughly clean, a process which retards decomposition and makes the fish firmer, with a fresher, finer flavour. Thus prepared, dry cold air makes them imperishable. Immature herrings, sprats, etc., called "whitebait," are always eaten whole, unbled, ungutted, and uncleaned, and too often, like other bigger fish, insufficiently cooked. Whitebait are frequently taken from about sewer outfalls.

Sewage-fed Oysters, Clams, Mussels, Periwinkles, etc., Eaten Raw.

Oysters, together with their contained sewage water, are eaten quite raw, to which the enteric fever of the Duke of York was attributed, as well as the recent—April, 1894—epidemic of Asiatic cholera in Constantinople, where, therefore, the sale of shell-fish was temporarily forbidden.

Scallops, cockles, mussels, clams, and other tasty bivalves, besides whelks, periwinkles, limpets, sea snails, etc., gathered from about sewage outfalls, especially when eaten raw, are likewise often the unsuspected cause of preventable epidemic diseases—as typhoid fever and cholera. Lobsters and crabpots are frequently baited and set about sewage outfalls.

Fish is seldom sufficiently cooked to destroy its animal parasites and their eggs, as well as the harmful, dangerous bacteria, which filth-feeding "fish" are notoriously apt to harbour. Medical correspondents have often sent me various living worms which they had found at table in "cooked" —or, rather, insufficiently cooked—"fish." Boiled fish requires long cooking, especially if it is thick, like cod or salmon.

Temperatures at which "Fish" Should be Cooked.

If eaten at all, whitebait should be cooked at a temperature somewhat exceeding 400° F. Ordinary fish should be fried between 360° and 375° F., but if olive oil be used then it should be much hotter than when fat, lard, or butter are employed.

"Fish" from the mouths of rivers, docks, canals, streams, lakes, ponds, and other waterside premises receiving sewage matter are even in a worse sanitary position than sewage-fed marine fish. Hence the greater danger in eating raw molluscs with their juices, together with the enclosed sewage water, as in the case of the oyster, mussel, periwinkle, clam, etc.

Civilised Man a "Cooking" Animal.

Man has been often described as a "cooking" animal. In proportion as he is civilised, and educated in sanitary science, so does he become more and more careful, not alone as to the cooking of his solid food, but even, in some instances, he is cautious enough to have his fluid foods, like suspected milk or water, thoroughly boiled.

A low death-rate, with a low sick-rate, or longevity with a minimum amount of illness, is, in a great degree, the result of perfecting the processes resorted to so as to avoid pathogenic bacteria, parasites, and putrefactive food. Thus it is known that fatal trichinosis is practically almost exclusively confined to those nations who, like the Germans, eat raw ham, or ham insufficiently cured. Hence in a city where epidemics rage they principally carry off the poorer classes, whose food is generally more or less bad and scanty, and whose general environment is equally faulty.

The Bad Food of Savages.

Again, it is in a great measure owing to carelessness, or inability to obtain cooked, healthy solid and liquid foods, including pure drinking water, that savages or semi-civilised races become gradually exterminated or extinct to make way for more cultured nations.

Domestic Animals.

Because of usually getting better food and drinking water, domestic animals live longer, where they are well cared for, as among the rich, than similar creatures whose owners are compelled by their poverty to more or less neglect their live stock, which therefore have comparatively a much shorter existence.

Where pasture and grass are scarce, as in some arctic regions, the occasional feeding of cows on fish may communicate a fishy taste and odour to the milk of such cattle.

The superiority of English, Scotch, and Irish breeding cattle and horses is to a great extent due to their improved surroundings and feeding. Notoriously in Oriental countries, where many domestic animals, as their dogs, have to feed and cater for themselves, such creatures are peculiarly prone to early fatal epizootic diseases, including parasitic affections. Hence dogs at the seaside eating putrid "fish" are liable to suffer from choleraic diseases. Every schoolboy knows that even a well-trained dog is too apt to seize putrid matter, such as a stray filthy bone.

Wild Animals.

Wild animals are more liable to frequent fatal epizootic diseases than domesticated animals, which are more or less judiciously fed and attended to. The increasing extinction of many species of wild animals of former days may also be thus accounted for.

Diseases Attributed to Unsound Food.

Of recent years scientific sanitary research and investigation have traced increasing numbers of avoidable diseases and epidemics to bad food, especially bad uncooked food and water. Therefore, one is more than justified in urging on the public the danger of eating uncooked oysters, clams, periwinkles, mussels, cockles, etc., especially as the consumer is not in the position to ascertain whether these animals, having been removed from sewage water, may not still contain such putrefactive matter, which would probably be destroyed by prolonged boiling.

In the case of oysters, cooking coagulates the albumen of the meat, rendering it tough and indigestible, and destroys the delicate flavour of these bivalves.

Few people would willingly risk the chance of a fatal fever for the pleasure of eating uncooked

oysters, clams, mussels, or periwinkles, which also frequently distribute the eggs of tapeworms or other parasites.

No Law Prohibits the Sale of Sewage fed "Fish" Oysters, Shell-fish, etc.

The present system of food inspection, especially as regards "fish," is an absolute farce, as the consumer is unprotected. Unfortunately there appears to be no law forbidding the sale of sewage fed aquatic and amphibian animals.

SCHOOL CLOSURE FOR INFECTIOUS DISEASES IN TOWNS.*

By M. A. Adams, F.R.C.S., M.O.H. for Maidstone.

I have a word to say regarding school attendance in connection with the spread of scarlet fever and diphtheria. Of course, both are very contagious, and because children at school-going ages are most susceptible, it naturally follows that school attendance is a frequent means of propagation; consequently the closure of schools is often resorted to as a means of staying the spread of such diseases. To the best of my judgment, in towns at all events, when due care is taken, this course is seldom necessary, but often mischievous; practical experience convinces me that in the general way less risk is incurred by keeping children together under discipline and intelligent observation, than by sending them home to run loose upon the streets and out of sight and beyond the reach of discipline. I have repeatedly observed that the sudden accessions of these diseases often follow upon "treats," holidays, harvestings, and the like gatherings, but seldom arise during the regular course of school attendance. My rule is, in every instance upon infection being notified, immediately to stop all school attendance from the infected house, and by communication with the school authorities concerned, to prevent its resumption from implicated households until all risk is past.

With diphtheria, closure of a school on occasion may be necessary, not for the purpose of distributing the scholars, but because the school building, or the soil upon which it stands, has become the actual breeding ground of the infection, and before the disease can be got rid of, radical methods of disinfection must be resorted to. In my belief the repeated reappearance of diphtheria in certain cases on the reassembling of schools is to be explained, not by the scholars bringing the disease back to the school, but by their return to an infected building; and probably this is possible with diphtheria more than with most other diseases, because the bacillus of diphtheria is capable of living a saprophytic life at a comparatively low temperature when circumstances are favourable, in the structure of the building or the soil upon which it stands.

* From Mr. Adams' Annual Report for 1893.

OPEN MANHOLE VENTILATORS AND DIPHTHERIA *

By Sidney Davies, M.D., Medical Officer of Health, for Plumstead.

The desirability of having manholes in connection with the sewers at frequent intervals is undisputed. The only question is whether these manholes should be closed, or should be provided with open gratings.

(*a*) *Open Manholes Ineffectual and Unnecessary.*—The chief object of all ventilation of sewers is by giving vent to the sewer gas outside houses to diminish the chance of its finding its way to the inside of houses, whether by faulty traps, or by forcing the traps, or by faulty drains under houses, or in any other way.

We see that the advocates of these ventilators recognise the injuriousness of sewer gas by the very fact of their attempting to keep it out of houses. They say, however, that the gas is much more injurious inside houses than outside, and this is true. But when there is direct communication between a sewer and the interior of a house the sewer gas would be drawn into the house in spite of open manholes.

The proper way to prevent sewer gas from entering houses is by having a disconnecting syphon on the house drain and a ventilating shaft at its termination. If anything more than this is needed on the sewer side of the disconnection another ventilating shaft should be run up the house from the drain between the disconnection and the sewer. This would produce far greater security than any number of grid ventilators on the sewers.

Another object of open manholes is to so dilute the sewer gas with fresh air as to oxidise it and render it innocuous. But unfortunately this object is not attained even by having the manholes at frequent intervals, as many members of the committee have observed for themselves in Plumstead Common Road, where four manholes within 150 yards are frequently found all emitting vile stenches at the same time.

The fact is that when sewers are badly constructed, so as not to allow the sewage to escape rapidly, there is such decomposition and formation of noxious effluvia as no amount of open manholes can render innocuous. A foul ditch is a nuisance, though it be completely open to the air. Much more so a foul sewer only partially open.

So far I have shown that (1) open manholes are not the best means of keeping sewer gas out of houses; (2) they cannot by themselves be relied on to attain this end; (3) they are ineffectual in rendering sewer gas innocuous by oxidation.

(*b*) *Open Manholes a Nuisance.*—But these manhole ventilators are not only unnecessary, but they are undesirable for two reasons: (1) because

* Abstract of Report to Sanitary Committee, Plumstead.

they are foul smelling and unpleasant; (2) because they also produce disease.

If open manholes are unnecessary as a protection against sewer gas, the fact that they emit foul odours is sufficient reason for adopting different methods.

The question of the amount of disease caused by manhole ventilators is a very difficult one, and one about which doctors differ.

1. There is no difference of opinion as to the not infrequent occurrence of attacks of diarrhœa, sickness, indigestion, and headache. Attacks of all these maladies have been known to follow immediately after breathing fœtid sewer air.

2. Enteric or typhoid fever has been proved pretty clearly to be spread by the air of sewers (Parkes' "Hygiene"). The origin of a recent epidemic of enteric fever at Stockport has been traced by the medical officer of health to the grid ventilators at the heads of some sewers. Two or three cases of enteric in Plumstead have recently been attributed to breathing foul emanations from sewer openings.

3. Diphtheria.—Dr. Thorne is the author of the principal recent work on diphtheria. In it he endeavours to show that the principal factor in the recent serious increase of diphtheria in towns is school aggregation, by means of which slight forms of sore throats may become developed into virulent diphtheria.

But Dr. Thorne himself allows that these slight forms of sore throat may be caused by inhaling sewer gas. And Dr. Thorne is obliged to admit that insanitary conditions seem to have caused some outbreaks of diphtheria. But the majority of sanitarians and medical authorities recognise insanitary conditions as one of the chief causes of diphtheria, though, of course, diphtheria being a directly infectious disease many of the cases which occur are quite independent of sanitary conditions, especially when the disease is epidemic, as in London at the present time.

The principal reason why this formerly generally accepted view has been questioned is that diphtheria has increased in towns concurrently with a general improvement in sanitary conditions, especially in the formation of sewers. Now undoubtedly the formation of sewers is a great sanitary advance on most older methods of sewage disposal. But they have not always been an unmitigated boon, for they have been shown to be the means of spreading enteric fever as referred to above. And who can say that they may not also by means of their ventilators spread diphtheria. Dr. Adams, medical officer of health at Maidstone, has traced an epidemic of diphtheria at that town to the manhole ventilators.* I will not go into details as to my reasons for suspecting that the recent prevalence of diphtheria in Plumstead is due to the same cause. They are partly given in a paper read by me at the last meeting of the British Medical Association, and also mentioned in my last annual report. They are briefly as follows: (1) Diphtheria is far commoner in Plumstead than Woolwich; (2) Plumstead has manhole ventilators, Woolwich has not; (3) the recent increase of diphtheria in Plumstead has coincided in time with the increase in number of the manhole ventilators; (4) I can find no other conditions to account for this remarkable prevalence of diphtheria in Plumstead compared with Woolwich.

To summarise, I think I have shown that, although the whole question of diphtheria is still *sub judice*, there are very good reasons for considering its recent increase in great part due to open manholes, and that no other explanation has been found to account for its greater prevalence in Plumstead than Woolwich.

In conclusion, I submit that, if I have not shown sufficient reasons to make the Board give up altogether the system of road ventilators I have at least proved: (1) That sewer gas is a nuisance and injurious to health, whether inside or outside of houses; (2) that open manholes alone do not prevent the risk of sewer gas getting into houses, and cannot render it innocuous by oxidation where sewers are foul.

And I therefore recommend strongly: (1) That all houses should be disconnected from the sewers instead of the house drains being used as sewer ventilators, without any disconnection; (2) that large (6-8 in.) shaft ventilators be erected at the heads of all sewers of steep gradients; (3) that above all, the sewers be systematically flushed by automatic flushers or otherwise.

* Russell's "Epidemics, Plagues and Fevers.

THE ANTHRAX ORDER OF 1892.—This order, which came into force on the first day of 1893, provides that the inspectors of the local authorities under the Contagious Diseases (Animals) Acts shall forthwith on receipt of notice of the existence of anthrax give information of the receipt of the notice to the medical officer of health of the sanitary district in which the disease has appeared. Acting in pursuance of this provision, the chief constable of Berkshire gave notice of an outbreak of anthrax at Spencer's Wood to me as medical officer of health of that district, and this information proved of much value, because it enabled us to cause the carcass of a cow to be buried which was believed to have been affected and had been brought into the borough. A butcher who had cut the carcass up suffered from a poisoned wound in his right hand; and his son, who had assisted him, was found by Dr. Wilcockson to be suffering from anthrax. The boy was removed into the Royal Berkshire Hospital, where he was operated upon, and recovered.—*From Dr. Ashby's Annual Report, Reading*, 1893.

ANALYTICAL NOTES.

Gottlieb has recently published a process, devised by himself, for the estimation of milk fat. He takes 10 grams of milk in a measuring cylinder (40 c.m. high), and divided into 0·5 c.c. This is shaken with 1 c.c. of 10 per cent. solution of ammonia, and again after addition of 10 c.c. of alcohol and 25 c.c. of ether. Now 25 c.c. of light petroleum are added, the cylinder again agitated and left for at least six hours. The volume of the upper layer—a solution of fat in ether and light petroleum—is read, and most of it transferred by means of pipette to a weighted flask, the solvent evaporated, and the flask and residual fat dried for one or two hours at 100°, then weighed, and the percentage of fat calculated. The method may be simplified as follows: Measure milk by pipette, and treat as above. Total volume will be 70·5 c.c.; upper layer, 17·5 c.c. Take out just 51·5 c.c., multiply weight of residue in milligrams by 10, and this will give percentage of fat in milk. Potash or soda may be used in place of ammonia.

Graffenberger has just concluded some carefully-made comparative trials of the various methods for milk fat estimation. He seems to consider Soxhlet's the most exact, as he has used that as the criterion for all others—all give too low results. Apart from Soxhlet's, Schmid's and Gottlieb's tally well with one another, but Schmid's is the most rapid to work. Guter's and Demichel's can only be considered as preliminary methods, consequently Graffenberger recommends the methods of Schmid and Gottlieb as being, taking everything into consideration, the most exact, rapid, and cheapest. The author of these Notes, whose experience in milk fat estimation is extensive, has found the paper coil method to yield slightly higher results than any other, but for practical accuracy and rapidity Schmid's process is in every way to be preferred.

One of the most useful methods for the exact estimation of nitrous acid in water for sanitary purposes is that known as Trommsdorf's Zinc Iodide Starch process. So small a quantity as 0·002 milligram of N_2O_3 in one litre may be detected by it. The reagent is thus prepared: 20 grams of zinc chloride are dissolved in 100 c.c. of boiling water, and four grams of starch, which has been previously ground to a milky fluid, with a little water. This mixture is now further boiled, being constantly stirred until all the starch is converted into paste. When this has taken place it is diluted to one litre, two grams of zinc iodide added, and the mixture then filtered in a place protected from light. The effect of the filtering is to remove practically all the starch, only invisible particles pass through with the filtrate, which is perfectly clear, and deposits no sediment whatever on keeping, which should be done in a bottle of some nonactinic colour.

An estimation is usually made by taking 100 c.c. of the water to be examined in a Nessler cylinder, adding 1 or 2 c.c. of dil sulphuric acid and 3 c.c. of the zinc iodide starch reagent, when a clear blue colour—containing no flocculent starch-iodide—is developed, if nitrous acid is present. When only extremely minute traces of N_2O_3 are present, it is several hours before the first tinge appears, but in average quantities the colour develops in a few minutes. The quantity present is calculated by taking similar cylinders containing standard nitrate solution, and treating as above, convenient quantities being from 0·01 to 0·1 milligram, N_2O_3 per cylinder of 100 c.c. To ensure accuracy by this process it is necessary that the reagent is added to all the cylinders simultaneously, and that all are of equal temperature The lower the temperature the more sensitive the reaction. The presence of organic matter, ammonia, or nitrates, does not in the least interfere, but hydrogen sulphide and sulphurous acid have a deterrent effect.

W. Brantigam and Edelmann have devised a method for the chemical recognition of horseflesh. It is based on the well-known iodine reaction of glycogen, a body which is a constant constituent of horseflesh. The finely divided flesh is boiled with four times its weight of water, and the resulting broth treated with dilute nitric acid and filtered. Saturated hydriodic acid is then added, so that the two liquids form distinct layers, when, if glycogen is present, a red or violet ring is seen at their junction In the event of extraction of the glycogen with water being inadequate, a solution of caustic potash containing KHO, equal to 3 per cent. of the weight of the flesh, must be substituted. The reaction is said to be characteristic, as it is not yielded by the flesh of any other domestic animals.

A member writes asking where a more detailed account of Schmid's process of milk-fat estimation than that given in Public Health is to be found. Those wishing fuller information are referred to an article in the *Chemical News*, Vol. 60, No. 1,562, by A. W. Stokes.

The Medical Officer of Health for the City of London.—The Commission of Sewers at a recent meeting decided to increse Dr. Sedgwick Saunders' salary as medical officer of health from £1,100 to £1,500, and as public analyst from £100 to £200 per annum. In appreciation of the services of their skilled officers the City Fathers set a worthy example to other local authorities.

SMALL-POX AT LEICESTER.

The statistics of small-pox at Leicester have been already published in PUBLIC HEALTH. It is not therefore necessary to repeat them; but the annual report of Dr. Priestley now before us contains important additional information, which we propose to summarise. In doing so, we congratulate Dr. Priestley on the courage and tenacity of purpose shown in the midst of difficult circumstances, and on the fearlessness and explicitness with which everything is set forth in his report.

Quarantine at Home or in Hospital.—From the quarantine statistics we find that out of 1,261 persons who have come into more or less direct contact with small-pox in infected houses, 899 were 10 years and over, and of these 69 sickened; whilst of 347 cases of small-pox, 240 were of the same age-period. It is clear, therefore, that small-pox has broken out chiefly amongst the vaccinated adult population, and has been prevented from spreading, not only by prompt isolation and other measures taken, but also by the fact that our adult population is vaccinated, and therefore semi-protected; while, at the same time, 107 children under 10 years have suffered. What would have happened had the small-pox "caught on" amongst children of that age-period, it is serious to contemplate. Or again, if all Leicester comes to be unvaccinated (adults as well as children) I feel satisfied that, despite such efforts as have been put forward by the sanitary department, Leicester will suffer severely. There have been 362 children under 10 years of age through quarantine—91 vaccinated and 271 unvaccinated—and of the former 2, whilst of the latter 52, sickened. Further, of 39 children under 10 years vaccinated during quarantine, 3 sickened; whilst of 231 unvaccinated, 49 sickened. Of 87 revaccinated persons, 2 sickened; whilst of 72 persons revaccinated in quarantine, 3 sickened. It is interesting to compare the attacks amongst those children under 10 who were vaccinated at once (*i.e.*, as soon as the disease broke out in their homes) and amongst the unvaccinated of the same age-period; also to compare the vaccinated persons 10 years and over, and those who were revaccinated at once (*i.e.*, as soon as the disease broke out in their homes), in regard to their liability to attacks of small-pox. Thus—children under 10, unvaccinated, 21·2 per cent. sickened; children under 10, vaccinated at once, 7·6 per cent. sickened; 10 years and upwards, vaccinated, 7·5 per cent. sickened; revaccinated at once, 4·4 per cent. sickened. Of 343 unprotected quarantines, I only succeeded in persuading 51 (*i.e.*, 15 per cent.) to be vaccinated; and of 804 semi-protected quarantines, 72 (*i.e.*, 8·9 per cent.) to be revaccinated. Of the former, 4 were done in the hospital, and 47 outside; whilst of the latter, 1 was done in the hospital, and 71 outside. I am satisfied that in an epidemic of small-pox, quarantining of persons who have come into contact with the disease can be carried out satisfactorily at their own homes, more efficiently, and at a much less cost, than in a special building or buildings built for the purpose.

Average Stay in Hospital.—The length of stay in hospital of the different cases (facts interesting and of importance financially) was as follows: Average length of stay in hospital (days)—under 10 years, vaccinated=14·5, unvaccinated=47·3; 10 years and over, vaccinated=28·6, revaccinated=26·8, had previous small pox attacks=14; unvaccinated=44·2.

Fever Hospital Staff.—At the time of the small-pox outbreak at the end of 1892, our fever hospital staff consisted of 28 persons in all. Of these 28, 22 were "efficiently" protected, either by a previous attack of small-pox, or by revaccination (including 8 whom I revaccinated), whilst the remaining 6 had only been vaccinated in infancy, and were not, therefore, "efficiently" protected. Of these 6 "inefficiently" protected officials, all of whom refused revaccination, which I offered them, 5 contracted small pox and 1 died The only one "inefficiently" protected to escape was the matron, who, of course, was not much exposed to the contagium, taking no part in the actual nursing of small pox cases, and only entering the wards occasionally. One nurse (said to have been revaccinated ten years ago) suffered from a doubtful attack of modified small pox (half a-dozen spots in all, and these abortive), and, curiously enough, she too refused revaccination when I offered it her at the beginning of the outbreak. I am unable to ascertain whether or not her revaccination was efficiently done, the medical man who is stated to have performed it having died. Her case (if small-pox at all) would seem to point to the advisability of even revaccination being redone in times of small-pox epidemics. During the epidemic 1892-3, there have been 12 additions to the small-pox staff. They were all revaccinated. Thus, of 40 officials connected with our small-pox hospital, 6 were "inefficiently" protected, and of these, 5 contracted small-pox and 1 died; whilst of the other 34, all of whom were "efficiently" protected, either by revaccination or a previous attack of small-pox (as shown by extensive pitting), not one contracted small-pox. Comment is unnecessary.

Comparison of 1871-72 *with* 1892 93.—It is interesting to compare this present 1891-3 small pox epidemic wave passing over Great Britain with that which visited us in a severer form in 1871-2, and caused sad havoc in many large towns. Leicester had 346 deaths, and the number of cases as calculated by the then medical officer of health (Dr. Crane) was 3,297, showing that 32·7 per 1,000 of the whole population (estimated at 100,829) were attacked, whilst the ratio of mortality to cases was 1 : 9·5. At that time Leicester was more or less well vaccinated as regards primary vaccinations, and the result may be considered satisfactory when we

remember that there was no Infectious Diseases Notification Act, with its consequent isolation, disinfection, and quarantining, whilst sanitation was at a low ebb. In fact, Leicester in 1872 had to rely mainly, if not entirely, upon vaccination and re-vaccination, the small-pox being practically allowed to burn itself out amongst the inhabitants. In 1892-3, on the other hand, with the most stringent precautions taken in the way of isolation, disinfection, and quarantining, with a Notification Act well carried out, and with excellent sanitation, there have been 347 cases, showing that 1·8 per 1 000 of the whole population (estimated at 184,547) have been attacked, and the ratio of mortality to cases has been 1 : 16·5. In 1892-3 Leicester is equally well-vaccinated as regards its adult population, but the anti-vaccination movement is beginning to tell, especially upon the children under 10 years of age, and it is chiefly these proportionately who have suffered most severely from the ravages of small-pox.

Adult Population Well Vaccinated.—This unvaccinated element under 10 years of age is, in my opinion, Leicester's weak point; and certainly has proved so during our late epidemic. Taking the children under 10 years there have been 105 (unvaccinated) who have passed through our hands, whilst I am able to make the significant statement that there has not been a single case of a vaccinated child under 10 years of age treated for small-pox at the hospital during the whole of our epidemic. That many such vaccinated children have come into contact with small-pox is proved by the quarantine statistics, from which it is seen that 91 vaccinated children of such age-period (under 10 years) were in infected houses. Comparing these with the 271 unvaccinated children in quarantine of the same age-period, we find that the incidence on the vaccinated bears to the incidence on the unvaccinated the proportion of 1 to 8·7 per cent., *i.e.*, the unvaccinated children under 10 years of age have suffered eight* times as severely as the vaccinated ones.

Well Water at Cheltenham.—From a recent special report of Dr. J. H. Garrett it appears that over three thousand houses in Cheltenham, or nearly a third of the population of the borough, are still supplied with drinking water from shallow wells. These wells are chiefly sunk in the drift sand which overlies the clay. Old sewers and house drains run in close proximity to the wells, and the invariable presence of large quantities of nitrate is evidence of the previous contact with organic matter. It is not surprising to learn that typhoid fever has selected the houses supplied with such well-water in a preponderant number of cases.

* Excluding doubtful cases, the proportion is as 1 to 18·4, *i.e.*, the unvaccinated children under ten have suffered eighteen times as much as the vaccinated of the same age-period.

BACTERIOLOGY.

*Du Bois Saint Sévrin, Panaris des Pecheurs et Microbe Rouge de la Sardine.**—The author describes a most interesting variety of the "Panaris," or ulceration of the fingers common amongst fishermen using the line. In the present instance the author was consulted about a red colour which was observed on the sardines after they had been packed in their boxes and sealed. The boxes which had been sterilised in the process of manufacture showed by cultivation experiment that the sterilisation was effective, for no living organisms were obtained. An examination of the building and of the air was also negative. He next examined the workmen and found a number of the solderers suffering from a slight epidemic of panaris. An examination of their suppurating fingers revealed the presence in the pus of a chromogenic organism, allied to the bacillus prodigeosus and red bacillus of Kiel. He therefore concludes that the sardines and boxes had become contaminated by the workmen, whose hands, owing to want of cleanliness, were constantly infected. Associated with the red microbe he found another anaerobic variety.

Sanarelli, Etudes sur la Fièvre Typhoide Expérimentale.†—This is a paper of considerable length, and is interesting from many points of view. In it he deals with the manufacture of the toxine, and the relationship and interaction of the Bacillus of Eborth and the B. coli-commune. The following is his *resumé*: (1) The typhoid bacillus produce in the body an active toxic body which acts upon the nervous centres and produces rapid collapse. (2) The toxine has a powerful action upon all the mucous membrane, especially upon the large intestines and the intestinal adenoid gland system. (3) In experimental typhoid just as in human, the typhoid bacillus is not found in the intestinal tract. This confirms the fact that the intestinal lesions proper to typhoid have a toxic origin. (4) This absence is explained by the fact that typhoid is essentially a lymphatic infection, and that the multiplication of the virus, and the formation of the toxine is carried on in the lymphatic gland tissue. Further, the damage produced by the poison on the intestinal wall favours the growth of the B. coli-commune, which tends to become the sole occupant of the tract. (5) The Bacillus coli-commune is responsible for the secondary ulcerative and other changes in the alimentary tract. (6) Animals vaccinated against the typhoid bacillus are also immune against the B. coli-commune. The author obtains his toxine as follows: A 2 per cent. glycerine broth is inoculated with typhoid virus of exalted virulence obtained by repeated passes through the guinea-pig (peritoneæ injection). The broth is then incubated for a month at a temperature of of 37°C; then sterilised and allowed to remain.

* Annales de l'Institut Pasteur. March 25th, 1894.
† Annales de l'Institut Pasteur, April 25th, 1894.

for eight months at the temperature of the room. Subsequently the flasks containing the broth are sealed and subjected to a temperature of 60°C for a few days. In this way the author supposes that he obtains, by the process of maceration, the toxine from the substance of the bacillus. Immunity is produced, according to the author, by repeated inoculations of sterilised cultures of the typhoid bacillus.

RECENT RESEARCH.

The Action of Wine and Beer on Microbes.

Dr. Pick experimented with the cholera and typhoid bacilli, and used the white and red wines, Pilsener, Münchener, and Lager beers. He demonstrated that wine, added in the proportion of 1·3 to water containing cholera germs, rendered it completely innocuous for drinking purposes within five minutes. The typhoid bacilli were more resistant. The wine must be undiluted, and its action must last for at least half an hour. The germicidal power lies in the presence of free organic acids, since neutralisation destroys it. Lactic, acetic, tartaric, and citric acids in solutions of 0·2 per cent. strength destroyed cholera bacilli after five minutes. To render typhoid bacilli inert, he found 2 per cent. strength necessary. The activity of the acid is to some extent unevenly proportional to its molecular weight.—Dr. Pick, *Archiv. für Hygiene, XIX.* 1.

The Self-purification of Streams.

This has been ascribed to the action of the oxygen dissolved in water, to the growth of certain algæ, the influence of sunlight, etc. Buchner suspended certain microbes (pure cultures of typhoid bacilli, bacillus coli, pyocyaneus, comma bacilli, etc.) in water contained in glass vessels of different forms, in which the height of the fluid was also varied. The results showed that direct sunlight has a powerful germicidal effect, *e.g.*, a sample of water, containing 100,000 germs per c.c., after one hour's exposure, contained no living germs at all, while in a similar sample kept in the dark they had somewhat increased. Diffused sunlight was not so powerful, but still possessed considerable disinfecting properties. Further experiments demonstrated the fact that the sunlight was still powerful, even at a depth of two metres. In muddy water the action of light is hindered.—*Archiv. für Hygiene, Bd. XVII.*

The Action of Cresol in Aqueous Solution.

Gruber has made experiments on cresol dissolved simply in aqueous solution. He showed that the solubility of ortho and parakresol is by no means so small. A solution of 1 per cent. by volume killed micrococcus pyogenes aureus in 30 seconds, ½ per cent. destroyed a cultivation of the same in about 10 minutes, and comma bacilli in two minutes. The 1 per cent. strength is colourless and clear. —Gruber, *Archiv. für Hygiene, XVII.*

LAW REPORTS.

A Decision Reversed on Appeal.

The decision of the Court of Queen's Bench in the case of "Hill v. The Wallasey Local Board," reported in Public Health, Vol. V., p. 220, has been reversed by the Court of Appeal. The case, it will be remembered, involves the question of the right of an urban sanitary authority to enter upon private lands without the consent of the owner for the purpose of laying water mains.

The facts of the case, stated shortly, are as follows: The plaintiff, Hill, was the owner of land comprising the site of a road, two houses, and two plots marked out for building, the road being the only means of access to the houses and plots. The defendants, the Wallasey Local Board, without giving notice to Mr. Hill, and without his consent, entered upon the road and proceeded to lay down pipes for the purpose of carrying water from a well which they had sunk in adjoining land to part of their district lying beyond Mr. Hill's property. Mr. Hill, claiming this road to be his private property, commenced an action for an injunction to restrain the Local Board from interfering with it, and, as reported in the number of Public Health above referred to, he obtained an interim injunction granting him the relief he asked. Upon the trial of the action this interim injunction was made perpetual, and from this judgment the Local Board appealed.

The question of the lawfulness or otherwise of the proceedings of the Local Board depended upon the construction of certain sections of the Public Health Act, 1875. By section 54 of that Act a local authority, where they supply water within their district, are given the same powers for carrying water mains within or without their district as they have for carrying sewers within or without their district. By section 16 of the same Act a local authority is empowered to carry any sewer through, across, or under any turnpike road or any street or place laid out as or intended for a street, and after giving reasonable notice in writing to the owner or occupier—if, upon the report of their surveyor, it appears necessary—to carry such sewer into, through, or under any lands whatsoever within their district.

Section 57 of the Public Health Act "for the purpose of enabling any local authority to supply water," incorporates with that Act, *inter alia*, the following provisions of the Waterworks Clauses Act, 1847, viz., "with respect (where the local authority have not the control of the streets) to the breaking up of streets for the purpose of laying pipes," and these incorporated provisions prevent a water authority from laying down pipes in any land not dedicated to public use without the consent of the owners and occupiers thereof.

It will be observed that the 57th section of the Public Health Act above referred to incorporates the provisions of the Waterworks Clauses Act,

1847, as to the breaking up of streets only in cases "where the local authority have not the control of the streets."

Where the local authority have the control of the streets it is clear that they may, under the provisions of the Public Health Act above referred to, lay their water mains in any turnpike road or any street laid out as or intended for a street without the consent of any person whatever, and they may, where necessary, carry their water mains through any private lands after giving reasonable notice in writing to the owner. On the other hand, where the local authority have not the control of the streets, they are subject to the incorporated provisions of the Waterworks Clauses Act, 1847, which prohibit the laying of pipes in any land not dedicated to public use without the consent of the owners and occupiers.

The Wallasey Local Board, being an urban sanitary authority, were a local authority having the control of the streets in their district, that is to say, of the roads and places dedicated to the public use, but this particular road was a private one, and the Local Board had no control over it. The chief point in the case, therefore, arose on the meaning of the words in the 57th section of the Public Health Act generally, "where the local authority have not the control of the streets." Did they mean where the local authority have not the control of the streets generally or where the local authority have not the control of the streets intended to be broken up.

The Court of Appeal were unanimous in holding that the private road was a "street" within the meaning of the Public Health Act, 1875, and that were it not for the provisions of section 57 of that Act incorporating certain parts of the Waterworks Clauses Act, 1847, in cases where the local authority have not the control of the streets the Local Board would be within their rights in breaking up the road without notice to or the consent of the owner.

As to the effect of the words in the 57th section of the Public Health Act, "where the local authority have not the contrrol of the streets," however there was a difference of opinion.

The majority of the Court of Appeal (Lords Justices Lindley and Davey) held that the words in question refer to the control of the streets generally and not to the control of the particular streets about to be broken up for the purpose of laying water mains and pipes, and consequently that in the case of a local authority having the control of the streets generally, such as the Wallasey Local Board, the section has not the effect of incorporating into the Public Health Act the provision of the Waterworks Clauses Act prohibiting the laying down of pipes in private lands without the consent of the owners and occupiers thereof, and that therefore the Local Board were not affected by the last-mentioned provision, and were justified in entering upon the appellants' land and laying down water mains as they had done.

The third judge of the Court of Appeal (Lord Justice Smith) held on the contrary that the words "where the local authority have not the control of the streets" in section 57 of the Public Health Act, 1875, refer not to the control of the streets generally, but to the control of the particular streets which are about to be broken up for the purpose of water mains and pipes, and that in the present case, as the road in question was a private one, the appellants were not justified in the course they had taken.

In accordance with the opinions of the majority of the Court the injunction granted in the Court below was dissolved and the action dismissed.

The case is also reported in Law Reports (1894) 1 Chancery Division, p. 133; 9, Times Law Reports, p. 73, 42 Weekly Reporter, p. 81; 63 Law Journal, Chancery, p. 71, and 69 Law Times Reports (N.S.), p. 641.

The Form of an Analyst's Certificate under the Sale of Food and Drugs Acts.

The case of "Bakewell v. Davis," heard in the Queen's Bench Division of the High Court of Justice on November 3rd and 4th last, decides a further question as to the form of an analyst's certificate under the above Acts.

It appears that the appellant was charged before the Justices for the City of Birmingham with having sold milk containing 22 per cent. of fat less than natural, and that such sale was to the prejudice of the purchaser, and contrary to the provisions of the Sale of Food and Drugs Act, 1875. On the hearing it was proved that the sample had been taken by an inspector of nuisances from a churn of milk in course of delivery by the appellant to certain purchasers in pursuance of a contract for the sale of milk, and that a label was attached to the churn stating that the contents were warranted to be new and pure milk.

The certificate of the result of the analysis stated that the milk contained "22 per cent. of fat less than natural," and in the part of the certificate set apart for "observations" the following words appeared: "The abstraction of fat is a fraud, and may possibly be injurious to health. No change had taken place in the constitution of the article that would interfere with analysis."

The appellant stated at the hearing before the magistrates that he had taken no cream from the milk, and ascribed the poorness of it to the dryness of the season and the quality of the food of the cows, and evidence was called to show that the poorness of the milk was due to natural causes. It was further contended on his behalf that the analyst's certificate was invalid, as the words "22 per cent. of fat less than natural" were not in compliance with the prescribed form, and did not set out the parts of the sample, *i.e.*, the constituent or component parts of the milk, and that the

insertion of the words, "the abstraction of milk is a fraud and may possibly be injurious to health," under the head of "observations" was wrong as assuming abstraction, which was the main point at issue, and as being calculated to prejudice the defence, and not authorised by anything contained in the note at the foot of the certificate which related only to mixtures.

The justices convicted the appellant, but stated a case for the opinion of the Queen's Bench Division upon the legal questions raised.

After hearing the arguments of counsel for the parties, the Court held that the conviction was right. As to the form of the certificate, they decided that the certificate sufficiently stated the result of the analysis, and that it was not necessary that the component parts of the sample should be set out, and that the words in the form of certificate as to parts or percentages of foreign ingredients only had reference to cases of adulteration. With regard to the observations relating to the abstraction of fat appended to the certificate, the Court considered that they were unauthorised and likely to prejudice the case, and should not have been inserted, but that they were not sufficient to invalidate the certificate.

The case is also reported in Law Reports (1894) 1 Queen's Bench, p. 296, and 69 Law Times Reports (N.S.), p. 832.

ANNUAL REPORTS OF MEDICAL OFFICERS OF HEALTH.

Leicester.

Vaccination.—During 1893 only 249 primary vaccinations were registered. As the vaccination laws are practically a dead letter in Leicester, it is clear, as Dr. Priestley remarks, that parents may have their children vaccinated without troubling to send in a certificate to the vaccination officer. From returns made to him by medical practitioners, Dr. Priestley estimates that from 2,000 to 3,000 vaccinations and revaccinations took place in Leicester during three months of the epidemic. The epidemic lasted altogether 14 months.

The special report of Dr. Priestley dealing with small-pox is dealt with in another column. Dr. Priestley uses the word "varioloid" to mean a disease simulating small-pox. As this term is already used, though inappropriately, to designate "modified small-pox," the new use for it will only serve to increase confusion. We also doubt the wisdom of commenting on any special method of treating small-pox. Such matter should be confined to the columns of the medical press.

Worcester.

Anthrax.—Dr. Mabyn Read gives an interesting account of eight cases of anthrax occurring among workers at a horse-hair factory. The occurrence of any further cases appears to have been rendered impossible, as the bales of horsehair are now subjected to high pressure steam disinfection on their arrival. Dr. Read adds: So far back as 1777 this disease was described in Paris as attacking horsehair workers, and it was recognised then that the most dangerous hair came, as now, from Russia. The first cases published in England were in the year 1847; but these attracted so little attention that, in a paper written on the subject in 1862, the author states that he was unable to find evidence of the disease in England. In a report by Dr. Russell to the Local Government Board in 1878, on cases of anthrax occurring at the Adelphi Horsehair Factory at Glasgow, it is stated that "it is unfortunately too probable that we cannot infer from the absence of any record of such outbreaks of anthrax among British hair workers that no such outbreaks have occurred. The probability is that they have occurred from time to time, but being chiefly of the intestinal or internal variety, as in the present instance, they have not been recognised."

There is no doubt that the spores of this fatal disease are brought in the hair; and mostly in that hair known as "Russian Manes," from the districts in Russia where it is endemic among the horses or cattle. The "manes" are often mixed with cow-hair, and are very dirty, and are said to be often derived from dead animals probably infected with anthrax.

Workers in foreign wool are subject to this disease, as well as men unloading cargoes of hides, or engaged in handling them in the raw state.

The thorough destruction of the spores is more easily managed in horsehair manufacture than in the other trades mentioned, and Messrs. Webb and Son have taken the best possible means to secure this end, and to protect the health and lives of the persons in their employ.

Ilkeston.

Dr. J. Carroll in his annual report discusses the origin of an outbreak of scarlet fever which was ascribed by some to a neighbouring sewage farm, and comes to the conclusion that the latter was not responsible for the outbreak. The water supply of Ilkeston is derived from brooks which are contaminated with sewage, and is condemned by Dr. Carroll. The occurrence of 77 notified cases of enteric fever in nine months in a population of 20,930 confirms the significance of this fact. The usual kind of closets are tub closets and ashpits.

St. Luke's, Middlesex.

Enteric Fever and Well Water.—In his annual report Dr. Yarrow gives an interesting account of five cases of enteric fever connected with the drinking of water from a well in his district. This well is about 35 feet deep, its water being used for business purposes and for drinking purposes by 84 persons. About 20 feet distant from the well are three water closets and a urinal, and about ten feet distant a second water closet. The water was found to be extremely polluted and contaminated with surface drainage.

YEADON.

Influenza.—Dr. Russell McLean discusses the vexed question as to whether any immunity against a second attack is conferred by influenza. He is of opinion that those persons who have once suffered from the disease are more liable to subsequent attacks. This is an interesting question. There appears to be little doubt that second attacks are much more common than in the majority of infectious diseases. What is wanted is an exact record and statement of the number of secondary cases in proportion to the total cases in any outbreak or in a practitioner's experience.

BACUP.

Dr. Brown draws attention to the fact that there is no disease which can be so readily conveyed by clothing, books, papers, etc., as small-pox. He advocates that all common lodging-houses should become the property of the sanitary authorities. He also enters a plea against the slaughtering of cattle and sheep under such circumstances as will allow their fellows to be onlookers. In one case a cow appears to have become infected with anthrax through woollen waste which was used for bedding.

KEYNSHAM RURAL SANITARY DISTRICT.

Mr. J. C. Heaven's annual report is a model health report for a rural district. Important sanitary facts and suggestions are stated plainly and fully, and nothing extenuated and nothing exaggerated. The history of the difficulties connected with the sewerage of the town of Keynsham (Somerset) is an instructive example of the procrastinating methods which find favour in many local councils. The description of the Local Infectious Diseases' Hospital is illustrated by a plan. The sewage is disposed of by sub-irrigation. The sewage is led to a large "tipper," of the same description as those used in Duckett's Wastewater Closets, which would act in the same way as a flush tank, and discharge the sewage periodically into the sub-irrigation drains. These drains are laid at such a distance below the surface as to enable plants grown on the plot to utilise some of the sewage and assist in its purification.

COWSHEDS.—The tenant farmers whose holdings are situated within the borough of Blackburn appear to be astonished that Dr. Wheatley, the medical officer of health for the borough, should require them to provide in their shippons 800 cubic feet of space for each cow put in them. They appear to consider that as other districts do not insist on this amount of space it is "somewhat hard" that they should be required to supply it. In the majority of well-regulated districts this space is required. When shall we have general regulations, which will free us from some of the results of the apathy of local authorities, and from the present unequal fulfilment of the law?

REVIEWS.

Investigations of Recent Typhoid Fever Epidemics in Massachusetts Made by or under the direction of WM T. SEDGWICK, Ph.D., Biologist to the State Board of Health of Massachusetts.—This is a reprint from the twenty-fourth annual report of the State Board of Health of Massachusetts for 1892. It contains an accurate and complete account of epidemics of typhoid fever which were traced to contamination of the river Merrimac. The results of these inquiries have been summarised in PUBLIC HEALTH. The present report should be read by all who are interested in this practical question.

Manual for the Use of Boards of Health of Massachusetts. (Boston: Wright and Potter. 1894.)—This manual contains the statutes relating to the public health, the medical examiner laws, and the laws relating to the registration of vital statistics, with decisions of the Supreme Court of Massachusetts relating to the same. Vaccination is compulsory before attaining the age of two years, and revaccination after five years from the first vaccination when the select men or mayor and aldermen shall require it. In 1877 the office of coroner was abolished, and medical examiners were appointed for each county. Their duties are specified in this volume. The registration of births and deaths has only recently become complete, and in most respects it is evident that we have little to gain by adopting transatlantic legislation. The comparison is one, however, that may be made with profit.

APPOINTMENTS.

MEDICAL OFFICERS OF HEALTH.

BALFOUR, J. M., M.B., C.M.Edin., re-appointed M.O.H. to the Presteigne Local Board.

BRYETT, LEWIS T. F., M.B., L.R.C.P.Lond., D.P.H., appointed M.O.H. for the Parish of Shoreditch.

CAMPBELL, P., L.R.C.P., L.R.C.S.Edin., appointed M.O.H. for the Pontypool R.S.D.

CLEAVER, WM. FILDER, L.R.C.P.Lond., M.R.C.S. Eng., re-appointed M.O.H. to the Phillack U.S.D.

DAVIES, EVAN, L.R.C.P. and S.Edin., appointed M.O.H. to the Maesteg Local Board.

GARLAND, E. C., L.R.C.P.Edin., M.R.C.S Eng., appointed M.O.H. to the Yeovil Borough.

HERBERT, A. W. C., L.S.A., appointed M.O.H. for Southwold.

JONES, W. M., M.R.C.S.Eng., re-appointed M.O.H. to the Swinton Local Board.

MCLEAN, CHAS. J. R., M.D.Edin., M.Ch., D.P.H., re-appointed M.O.H. to the Yeadon U.S.A.

PERCIVAL, THOS., M.R.C.S.Eng., re-appointed M.O.H. to the Pontefract R.S.D.

RANDOLPH, CHAS., L.R.C.P.Edin., M.R.C.S.Eng., re-appointed M.O.H. for Wellington R.S.D.

ROBERTS, FRANCIS H., L.R.C.P.Lond., M.R.C.S.Eng., re-appointed M.O.H. to the Llandrindod Wells U.S.D.

STEPHENS, EDWARD, L.R.C.P., M.R.C.S., re-appointed M.O.H. to the Chard Union R.S.D.

THOMSON, Dr., re-appointed Deputy M.O.H. to the Penrith R.S.A.

UBSDELL, HENRY, M.R.C.S.Eng., appointed M.O.H. to the Buckfastleigh U.S.D.

WILLOUGHBY, W. G., M.D., L.R.C.P.Lond., D.P.H. Camb., appointed M.O.H. for Eastbourne.

WHITAKER, GEORGE H., L.R.C.P., L.R.C.S.Edin., re-appointed M.O.H. to the Horwich U.S.D.

WILDING, WALTER F. W., L.R.C.P.Lond., M.R.C.S. Eng., re-appointed M.O.H. to the Hindley Local Board.

WOOD, W. DYSON, L.R.C.P. and S.Edin., re-appointed M.O.H. to the Thame Local Board.

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The Journal of the Incorporated Society of Medical Officers of Health.

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Medical Officers of Health and other Correspondents are requested to send regularly all published reports and matters of interest bearing upon Sanitation to the Editor, 11, *Gloucester Place, Brighton.*

NOTICE.

THE INCORPORATED SOCIETY OF MEDICAL OFFICERS OF HEALTH.
20, Hanover Square, London, W., May, 1894.

NOTICE is hereby given that the ANNUAL PROVINCIAL MEETING of the SOCIETY will be held at the CAVERSHAM BRIDGE HOTEL, READING, on SATURDAY, the 21ST JULY, at 11.45 a.m., for the transaction of the under-mentioned business:—

AGENDA.

1. Minutes.
2. Report of Council.
3. Discussion on "Medical Practice by Unqualified Practitioners in its Bearing upon Public Health."

In connection with the Annual Provincial Meeting, a RIVER EXCURSION has been arranged from READING to MAIDENHEAD. Lunch will be provided at Henley, and high tea at Maidenhead; and there will be a quartette glee party on board the launch.

The total inclusive charge for persons travelling from Paddington is one guinea; for others (who would make their own train arrangements), 16s. 6d.

Ladies will take part in the excursion; each member being entitled to bring with him friends, either ladies or gentlemen.

Application for tickets must be made to the Hon. Sec., Dr. Thresh, The Limes, Chelmsford, not later than July 16th.

It may be mentioned that a saloon carriage for 50 will be reserved by the train leaving Paddington at 10.17 a.m. on the 21st; and that the arrival at Maidenhead has been arranged so as to allow time for members from Birmingham and elsewhere to catch their trains.

F. P. WIGHTWICK,
55, Upper Brook St., Grosvenor Sq., W.
J. C. THRESH,
The Limes, Chelmsford.
} *Hon. Secs.*

THE CLOSURE OF INSANITARY HOUSES.—Members of the Board will remember that the years 1891 and 1892 were chiefly occupied by putting in force the powers given to local authorities by the Housing of the Working Classes Act, 1890, and the Public Health Act, 1891. The Board, on my advice, caused the demolition or closing of a large number of houses which were unfit for human habitation. In 1891 I gave certificates in the case of 67 houses, 52 of which were closed by a magistrate's order, 45 being afterwards demolished; 15 were closed, or the work done, without the magistrate's order, and 4 of these were voluntarily demolished by the owners. In 1892 the Public Health Act much altered our procedure, when 12 houses were closed under the Housing of the Working Classes Act, 9 being subsequently demolished, and no less than 49 houses were closed under the Public Health (London) Act, 19 being by a magistrate's order. I am of opinion that the Public Health (London) Act, 1891, has, to a great extent, replaced the Housing of the Working Classes Act, 1890. I now only give a certificate under the latter Act when I am of opinion that the case is one for demolition. It is obvious that a house may be unfit for human habitation at the time of inspection, and yet it may be quite possible, by spending sufficient money, to make it habitable. Under these circumstances I should proceed under the Public Health (London) Act; if, on the other hand, from want of air space or from general structural arrangement no amount of expenditure could make the house habitable, I proceed under the Housing of the Working Classes Act. This year most of the work has been taken under the Public Health (London) Act, and consequently an enormous amount of work, chiefly with regard to drainage, has been effected without any special reports or certificates being necessary.—*From Dr. Wightwick's Annual Report, 1893, for the St. Olave's District, Southwark.*

THE INCORPORATED SOCIETY OF MEDICAL OFFICERS OF HEALTH.

Special Council Meeting.

A special meeting of the Council of the Society was held at No. 197, High Holborn, on Tuesday, June 12th, 1894. The President (Dr. W. T. G. Woodforde) occupied the chair, and the following members were present: Drs T. Orme Dudfield, S R. Lovett, Sidney Davies, A. Newsholme, A. Bostock Hill, W. H. Kempster, H. L. Bernays, Louis Parkes, E. Gwynn, A. Wynter Blyth, J. F. J. Sykes, Mr. Henry C. Jones (hon. solicitor), and Dr. Thresh (hon. sec.).

The Hon. Secretary reported that the meeting had been convened in accordance with a requisition signed by the President, which he produced.

Annual Provincial Meeting.

The President stated that it had been suggested that the provincial meeting should be held at Reading, and that at the close of the meeting the members should proceed by steam-launch to Maidenhead, and he intimated that he had made certain inquiries with a view to the suggestion being carried out, and submitted the information he had obtained for the Council's consideration.

After some discussion it was resolved that the provincial meeting should be held at Reading on Saturday, July 21st next, that members be entitled to invite one guest (lady or gentleman), and that the President be requested to make the necessary arrangements.

Death Certification.

The Hon. Secretary reported that in accordance with the resolution of the Society he had prepared a petition for presentation to the House of Commons on the subject of death certification and registration; and he asked that the same might be sealed.

Resolved, that the common seal of the Society be affixed to the same, and the same was affixed accordingly.

Home Counties Branch.

The Hon. Secretary read an application which he had received, signed by twelve Fellows of the Society, asking for the approval of the Council to the formation of a branch to be known as the Home Counties Branch.

Resolved unanimously, that the Council do approve of the formation of the proposed branch.

The Council then proceeded to consider the report of the Special Committee appointed on January 15th, 1894.

The Hon. Secretary stated that the following report of the committee proceedings had been prepared by the hon. solicitor and forwarded to every member of the Council.

Report of the Special Committee Appointed by the Council on January 15th, 1894.

Your committee have to report that they have proceeded with the references made to them by the Council, which were as follows:—

1. The representation on the Council of the Society of the branches and of members not attached to any branch.

2. The resolution passed by the Yorkshire Branch that matters of general interest and importance should be referred to the branches before action is taken thereon by the Society.

3. Payment of travelling expenses of the members of the Council.

4. The desirability of including medical officers in the army, navy, and Colonial service engaged in active sanitary work among the persons qualified for election as Fellows.

Your committee consisted of the president, hon. solicitor, hon. secretaries, and the presidents and hon. secretaries of the branches.

As a preliminary measure, the hon. secretaries in the month of March addressed a communication to every branch on the subject of the reference, which it will be convenient to reproduce. It was as follows:—

The Incorporated Society of Medical Officers of Health.

(President, W. T. G. Woodforde, Esq., M.D.)

Offices, 20, Hanover Square, W., March, 1894.

Dear Sir,—The following subjects have been referred by the Council of the Incorporated Society of Medical Officers of Health to a sub-committee for consideration and report, viz.:—

1. The question of the representation on the Council of the Society of the branches and of members not attached to any branch.

2. Resolution of the Yorkshire Branch that matters of general interest and importance be referred to the branches before action is taken upon them by the Incorporated Society.

3. The question of the payment of the expenses of representatives attending meetings of the Council of the Society in London.

4. The question of including in the Fellowship of the Society medical officers holding appointments who are doing active sanitary work of a similar nature to that which medical officers of health are performing in this country.

The sub-committee is to consist of the following gentlemen: The president, the hon. secretaries, the hon. solicitor, and the president and secretary of each branch.

It will be seen at once that these matters cover a wide range, and involve, if carried out, the alterations of the articles of association, which alteration would entail considerable legal technicalities.

It is, therefore, most desirable that the representatives on this committee should come prepared to bring forward the views of their several branches; and with this object we venture to ask you to bring this communication before your branch as soon as convenient, and, if possible, to forward to us a summary of their opinions, so that when the committee meets we may be able to place before it a digest on the subject.

We would suggest that the committee should meet in London during the second week in April, in order that its report may be laid before the Council at its meeting on April 16th; and we should be glad to know what days would be most convenient to your representatives in that week.

We would take this opportunity of again asking you what day in the week would be most convenient to you and the members of your branch for the Society to hold its ordinary meetings in London.

An early reply to these questions will be esteemed a favour.—We remain, dear sir, yours faithfully,

F. P. WIGHTWICK, JOHN C. THRESH, } Hon. Secretaries.

In reply to this communication the following answers were received :—

THE INCORPORATED SOCIETY OF MEDICAL OFFICERS OF HEALTH.

Metropolitan Branch, April 14th, 1894.

DEAR SIRS,—I have the honour to report that the questions submitted by the Society to this branch for consideration and report were fully discussed at the last meeting, April 12th, 1894 when it was resolved :—

1. That any alteration in the constitution of the Council would involve an alteration in the articles of association, which this branch is of opinion is undesirable.

2. That this branch disagrees with the resolutions of the Yorkshire Branch, that matters of general interest and importance be referred to the branches before action is taken upon them by the Incorporated Society.

3. That the branch considers the payment of the expenses of representatives attending meetings of the Council of the Society in London is undesirable, and that the present subscription to the Society would be insufficient for the purpose.

4. That the branch disagrees with the suggestion to extend the eligibility for Fellowship of the Society beyond that provided for by the articles of association.—I have the honour to remain, Gentlemen, your obedient servant,

H. W. ROBERTS, Hon. Secretary.

BIRMINGHAM AND MIDLAND BRANCH.

Town Hall, West Bromwich, March 22nd, 1894.

DEAR DR. WIGHTWICK,—I have laid your letter before the Council of the Birmingham and Midland Branch, whose delegates will be prepared with definite views at the forthcoming Conference. I am, however, instructed to ask you to lay before the Council of the Society a further proposition which, it is hoped, the Council may lay before the Conference. The exact words are as follow : "That the sub-committee be also desired to discuss the advisability of so amending the articles of association as to more closely assimilate the constitution and conduct of the Society of Medical Officers of Health to that of the British Medical Association."

I am further to assure you that the great object in this resolution is to increase the interest taken in the Society, and to enlarge its sphere of usefulness.

It is probably known to several members of the Council that the council of my branch as long ago as January last suggested a conference of branch delegates to consider this question ; and that it is their hope and intention that such a conference shall take place before the meeting of the sub-committee. The Conference will probably be in Manchester at the end of April.

I am to ask you, on behalf of the council of my branch, to lay this letter before the April Council meeting.—I am, yours faithfully,

HERBERT MANLEY, Hon. Sec. B. and M. Branch.

NORTH-WESTERN BRANCH.

7, Shrewsbury Road, Birkenhead, March 19th, 1894.

DEAR SIRS,—Your letter relating to subjects referred for consideration to a sub-committee was read at the last meeting of this branch, and I was instructed to say that the president of the board or myself (or both) will attend the sub-committee if possible. The most convenient day of the week would be Friday, but neither Tuesday nor Wednesday are specially inconvenient.

The views of the branch as regards the subjects referred are as follow :—

1. That, for the present, each branch should be represented on the Council by its president and secretary, and three other representatives elected annually. The branch has formed no opinion as to how unattached members should be represented.

2. That the resolution of the Yorkshire Branch seems reasonable, "unless where delay is impracticable."

3. That the payment of the actual travelling expenses of representatives going to London should be arranged for, if funds allow.

4. That it would be desirable to permit medical officers holding such appointments to become Fellows of the Incorporated Society.—I am, dear Sir, yours very truly,

FRANCIS VACHER.

NORTHERN BRANCH OF THE SOCIETY OF MEDICAL OFFICERS OF HEALTH.

Old Elvet, Durham, April 13th, 1894.

DEAR SIRS,—Your letter of last month, with a list of subjects which had been referred by the Council of the Society to a sub-committee of the Society and branches for consideration, was brought before this branch at its last meeting; and, after carefully considering it, the Board passed the following resolutions :—

1. That the Northern Branch approves of the action of the Society in appointing a sub-committee, representative of the Society and the branches, to consider the subjects mentioned in the letter of the hon. secretaries, and deputes the President and the hon. secretary of the branch to attend the meeting of the sub-committee as its representatives.

2. That the question of the representation on the Council of the Society of the branches, and of members not attached to any branch, be left in the hands of the representatives of the branch.

3. That the action to be taken regarding the resolution of the Yorkshire Branch, "that matters of general interest and importance be referred to the branches before action upon them by the Incorporated Society," to be left to the representatives of the Northern Branch to take such action as they may think necessary in the interests of their branch.

4. That in the opinion of the Northern Branch the expenses incurred by representatives of the branches in attending the Council and general meetings of the Society should be defrayed by the Incorporated Society.

5. That the Northern Branch is opposed to "including in the Fellowship of the Society medical officers holding appointments in the army, navy, and Colonies, who are doing active sanitary work of similar nature to that which medical officers of health are performing in this country," and that its representatives on the sub-committee do oppose any such inclusion.

I shall be glad to know as soon as possible the date which has been arranged for the meeting of the sub-committee. A Friday or Monday appear to be the most suitable days for the representatives of this branch.

I think I have already informed you that Fridays or Mondays are the most convenient days to the members of this branch for the Society to hold its ordinary meetings in London.—Believe me, yours very truly,

T. EUSTACE HILL, Hon. Sec.

YORKSHIRE BRANCH, SOCIETY OF MEDICAL OFFICERS OF HEALTH.

Medical Officer of Health's Department,

Town Hall, Hull, March 14th, 1894.

MY DEAR SIRS,—In reply to your circular letter duly received, relative to the subjects referred by the Incorporated Society of Medical Officers of Health to a special sub-committee for consideration and to report thereon, I have communicated with our President (Dr. Whitelegge) as to the convenience of date for such meeting.

I would respectfully suggest Saturday, April 14th, as a convenient date, and one which would give country members

an opportunity of attending the full meeting of the Society on the Monday following and taking a part in the discussion.
—Believe me, yours truly,
J. WRIGHT MASON, Hon. Sec., Yorkshire Branch.

WEST OF ENGLAND AND SOUTH WALES BRANCH.

At a meeting of the above branch on May 3rd the circular letter of the secretaries of the Society relating to subjects referred to a sub-committee was considered, and the following resolutions were passed :—

1. That the Council of the Incorporated Society should, in the opinion of this meeting of the branch, consist of the officers of the Society and representative members elected by each branch.

2. That, in the opinion of this meeting of the branch, if the Council is a representative Council, as constituted above, the reference of matters to the branches for consideration be left to the Council's discretion.

3. That, in the opinion of this meeting of the branch, the first-class railway fare of representatives attending Council meetings in London be allowed.

4. That, in the opinion of this meeting of the branch, such medical officers shall be eligible for Fellowship of the Society. JOHN C. HEAVEN, Hon. Sec.

A conference of the North-Western, Yorkshire, and Birmingham and Midland branches having taken place at Manchester, the following resolutions were communicated by Dr. Herbert Manley, who acted as hon. secretary to the conference :—

1. That the special sub-committee be requested to consider the advisability of making such alterations in the articles of association as would give effect to the following recommendations :—

i. The Officers (other than vice presidents) shall be elected by the Council, and the rest of the Council shall be made up as follows: Each provincial branch of the Society shall elect two, and if containing more than fifty members three, representatives ; the Metropolitan Branch shall elect six ; and six shall be elected by the Council.

ii. Two general meetings shall be held in each year : one in London, which shall be the annual general meeting ; and the other in a convenient place in the provinces, to be fixed by the Council. No resolution in the name of the Society shall be passed except at such meetings, or at a special meeting regularly called and properly constituted, convened for the purpose.

The ordinary meetings of the Society shall continue to be held in London at such time and place as the Council may from time to time determine ; but at such meetings no resolution in the name of the Society shall be passed.

iii. The Council shall meet four times in each year in London, and, when duly requisitioned, as provided by the bye-laws. (Bye-law 4.)

iv. Every member of the Council shall be entitled to receive from the funds of the Society his first-class single fare on each occasion of his attendance at a Council meeting.

2. That copies of the above resolution be sent to the members of the sub-committee and to the secretaries of the Society.

The purport of these communications was conveyed to every member of the committee by the hon. secretaries on May 7th.

Your committee met at 20, Hanover Square, on Saturday, May 19th last, when the following gentlemen were present: The President (Dr. W. T. G. Woodforde), in the chair; the hon. solicitor (Mr. Henry C. Jones), and the hon. secs. (Drs. F. P. Wightwick and J. C. Thresh).

The following representatives of branches attended: Metropolitan, Dr. S. R. Lovett (president), Dr. H. W. Roberts (hon. sec.); Birmingham and Midland, Dr. Herbert Manley (hon. sec.); the Northern, Dr. Armstrong (president), Dr. Eustace Hill (hon. sec.); the Yorkshire, Dr. Whitelegge (president); the West of England, Dr. John C. Heaven (hon. sec.).

Letters expressing regret at inability to be present were read from Dr. Anderson and Dr. Wheatley (representing the North-Western Branch).

The HON. SOLICITOR explained the steps which would have to be taken to alter certain portions of the articles of association in the event of the adoption of the suggestions under consideration.

The HON. TREASURER to the Society (who was present as President of the Metropolitan Branch) informed the Committee of the amount of the annual income of the Society, apart from the income of Berridge's trust fund, and also reported the numbers, at the commencement of the present session, of fellows, members, hon. associates, and associates, numbers which have been substantially increased during the year.

The Committee dealt with the subjects referred to them seriatim in the order hereinbefore set forth, and, after careful consideration of the various subjects, arrived at the following conclusions :—

I. That, with a view of ensuring more thorough representation of the interests of the members of the various branches on the Council, the mode in which the Council is at present elected should be altered; and that, in lieu of the regulations on the subject contained in the 15th, 18th, and 19th Articles of Association, the following should be adopted :—

15. The management of the Association shall be vested in a Council, which shall consist of officers and fellows, elected as hereinafter provided.

18. The Council shall be elected as follows : Every branch of the Association except the Metropolitan shall, not later than the month of in every year, if it consists of fifty members or less elect two, and if it consists of more than fifty members elect three, of its members to represent it on the Council, and the Metropolitan Branch shall elect six of its members ; the names of the members so elected shall be forwarded by the hon. secretary of each branch to the hon. secretary of the Association not later than the 30th day of September in each year. At the meeting of the Council to be holden in October the Council shall elect from among the members of the Association six fellows, who, with the members elected by the branches and the officers, shall constitute the Council.

The names of the fellows proposed to be elected shall be given in writing to the hon. secretary twenty-one days before the meeting of the Council, and shall be inserted in the notice convening the same.

19. The Council shall at the meeting in November elect the officers (other than vice-presidents) for the ensuing year. The Council may fill up casual vacancies among the officers or members of the Council. All elections shall be by ballot.

II. Having regard to the alterations in the constitution of the Council just recommended, the

Committee were by a very large majority of opinion that the proposal of the Yorkshire Branch is unnecessary and would prove unworkable and impracticable.

III. The present annual subscription to the Society is only 10s. 6d. per annum. This is very low; and if the Council can see their way to exercise the powers vested in them by Article 11 and fix the subscription at one guinea, the committee would recommend that first-class return railway fare should be paid to each member of the Council on each occasion of his attendance at a meeting of the Council, and that in future the ordinary meetings of the Council should only be held in the months of October, December, February, and April.

IV. Your committee are of opinion that it is not desirable to admit any but medical officers of health, acting or retired, to the grade of fellow in the Society.

In the event of these recommendations being adopted, it will be necessary, having regard to Article 36, that the provisions of the Companies' Act, 1862, should be complied with, and these will require two special meetings of the Association.

W. T. G. WOODFORDE, President.

It was resolved, on the motion of Dr. PARKES, seconded by Dr. NEWSHOLME, that the report be received and entered on the minutes.

It was moved by the CHAIRMAN and seconded by Dr. PARKES that recommendation No. 1 be adopted.

A long discussion took place, in the course of which several alterations and amendments were suggested, and ultimately it was resolved as follows:

I. That the mode in which the Council is at present elected be altered, and that in lieu of the regulations on the subjects contained in the 15th, 18th, and 19th Articles of Association, the following be adopted:—

(*a*) 15. The management of the Association shall be vested in a Council, which shall consist of officers and fellows, elected as hereinafter provided.

(*b*) 18. The Council shall be elected as follows; Every branch of the Association except the Metropolitan shall, not later than the month of July in every year, if it consists of fifty members or less elect two, and if it consist of more than fifty members elect three of its members to represent it on the Council, and the Metropolitan Branch shall not later than the month of July in every year elect six of its members; the names of the members so elected shall be forwarded by the hon. secretary of each branch to the hon. secretary of the Association not later than the 31st day of July in each year. At the meeting of the Council, to be holden in October, the Council shall co-opt six Fellows, who, with the members elected by the branches and the officers, shall constitute the Council.

The names of the six Fellows proposed to be co-opted shall be given in writing to the hon. secretary twenty-one days before the meeting of the Council, and shall be inserted in the notice convening the same.

(*c*) 19. The Council shall at the meeting in April elect the officers (other than the vice-presidents) for the ensuing year, who shall come into office on the 1st day of October following. The Council may fill up casual vacancies among the officers or members of the Council. All elections shall be made by ballot.

Resolved that recommendation No. II. be adopted.

On the consideration of recommendation No. III.,

It was moved by Professor WYNTER BLYTH, seconded by Dr. KEMPSTER, and resolved, that the subscription to the Society be fixed at the sum of £1 1s. per annum.

Resolved, that it be recommended to the Society that the treasurer be authorised to pay to the treasurers of branches the proper expenses incurred in conducting the business of the branch, such sum not to exceed 5s. in respect of every member of such branch, provided he is a member of the Society.

It was moved by Professor BLYTH, seconded by Mr. JONES, and resolved, that the question of the payment of the expenses of members attending the meetings of the Council be adjourned till the meeting of the Council in April next.

It was moved by Dr. NEWSHOLME, seconded by Dr. THRESH, and resolved, that in future the ordinary meetings of the Association and of the Council be held in the months of October, December, February, and April.

Resolved that recommendation No. IV. be adopted.

Resolved, that the hon. solicitor be requested to take the necessary steps for the alteration of the articles of association so far as may be requisite for giving effect to the resolutions passed this day.

THE CONDITION OF GRIMSBY.—As Grimsby appears to have been the chief focus of cholera in England last summer, and as its fish trade brings it into touch with so many parts of the country, its sanitary condition is of Imperial importance. From a local newspaper we learn that Dr. Newby, its medical officer of health, stated that the sanitary department was in a state of chaos. There are abundant inspections and reports on these, but here the matter apparently stops. Cesspools are allowed to remain, and it is evident that the town is in an extremely insanitary condition. One Alderman of the Town Council recently remarked that the talk about percolation from cesspools was all a myth. If this is a fair sample of the municipal mind, it will probably take a severe outbreak of disease, with commensurate damage to the trade of the town, to bring about the necessary radical reform.

PROCEEDINGS OF THE NORTH-WESTERN BRANCH OF THE INCORPORATED SOCIETY OF MEDICAL OFFICERS OF HEALTH.

THE ordinary monthly meeting of this branch was held in the rooms of the Chemical Club, Manchester, on Friday, June 8th, at four p.m. The following members were present: Drs. Anderson (president), Barr, Edlin, Gornall, Graham, Hope, Kenyon, Littlejohn, Martin, Niven, Paget, Pilkington, Porter, Rhodes, Sergeant, Stephenson, Tattersall, Vacher, Wheatley, and Mr. F. Scott.

The minutes of the last meeting were read and confirmed.

It was proposed by Dr. SERGEANT, seconded by Dr. PAGET, and resolved that the expenses of the delegates to the Congress of the Sanitary Institute be paid by the branch.

A letter was read from the Secretary of the Society of Medical Officers of Health containing a resolution passed by the Northern Branch on the necessity for further legislation for suppressing medical practice by unqualified men. It was resolved that the consideration of the letter be postponed until the next meeting.

Dr. Herbert Jones, M.O.H. for Crewe, was duly elected a member. Mr. J. T. F. Bishop was elected an associate.

The following nomination was read: F. B. O'Flaherty, M.B., C.M., D.P.H. (as an associate), proposed by Dr. VACHER and seconded by Dr. HOPE.

Dr. PORTER asked what action had been taken with regard to the recommendations as to vagrants drawn up by the central Society, and whether any proposals had been made to the Local Government Board.

Dr. SERGEANT proposed, and it was resolved, "That the Secretary be instructed to write to the Secretary of the central Society and ask what action (if any) had been taken."

The following papers were then read:—

INSANITARY PROPERTY ABOUT TO BE DEMOLISHED IN LIVERPOOL, COMPRISING 578 HOUSES.

By E. W. HOPE, M.D., D.Sc., Medical Officer of Health for Liverpool.

Short Description.—The houses consist of three rooms, one above the other, connected by staircases, which lead directly from one room to the other, without any intermediate landing, so that the same atmosphere practically pervades the three rooms. These houses are placed back to back, and side to side, and for the most part are arranged in courts. The w.c.'s and the water supply are external to the houses, and are for the common use. The common receptacles for ashes and refuse are usually at the entrance to the courts.

The general condition of the property is one of ruin and decay, bulging walls, sunk window-sills, perished or crumbling mortar, rotten wood work, walls and ceilings stained by saturation with vapour of breath, and foul smelling.

Several of the houses in one of the streets have a cross ventilation on the lower floors, inasmuch as the window is on one side, and the door on the other. The advantage of this arrangement is minimised by the restricted spaces about the building, and the likelihood of the air supply being polluted; in regard to the repair and the condition of the interior there is little to choose between these and the rest of the houses.

A careful census has been taken of the population of these houses, which shows that the number of inhabitants is 1,960, and an investigation into the death-rate of the last five years reveals the fact that in three contiguous streets the average death-rate is 63·1, 67·0, and 71·4 respectively per 1,000 per annum, which is a higher rate of mortality than I have ever known to exist in any of the streets previously presented as unfit for human habitation, and which I am led to think is altogether exceptional. In another group the death-rate during the last five years is 34·6 per 1,000, a rate far less than the preceding group, but still exceptionally high, whereas the death-rate over the whole city for the same period is only 26 per 1,000.

The investigations made bring to light the two following important facts:—

First, that the number of empty houses is out of all proportion to the number found empty in the new cottage property erected on sites which have already been dealt with by the Insanitary Property Committee.

Thus the streets in question show 160 empty out of 578, whereas the unoccupied houses in districts such as New Henderson Street, Marlborough Street, Prince William Street, Stockdale Street, and many others, are not 3 per cent.

The large number of empty houses in the insanitary areas suggest that these degrading hovels are avoided even by the poorest.

The owners of the property in question are, as might be expected, indifferent to its decayed condition, and reluctant to attend to the commonest sanitary requirements, or to abate common nuisances in regard to it. This is evidenced by the fact that during the two years 1892 and 1893 no less than 851 notices were issued from the sanitary department to the owners to cause the abatement of nuisances more or less flagrant, such as choked and defective drains, defective closet seats and doors, dangerous cellar areas, dangerous roofs, defective and dangerous flags, and such-like.

The second important point relates to overcrowding.

There is no street in which overcrowding exists to a greater extent than in one of the streets now condemned, and that notwithstanding the incessant vigilance of the inspectors. The overcrowding in

this street has been so great that during the year 1893 upwards of thirty persons were convicted of this offence. Moreover, the overcrowding was of the worst kind, being carried on with entire disregard to the requirements of decency. Similarly, up to date, the same offence continues, and this notwithstanding the large number of empty houses.

Similar overcrowding, though to a somewhat less degree perhaps, is met with in others of the scheduled streets.

An epitome of the legal powers in the Housing of the Working Classes Act, 1890, was fully gone into, and the reader of the paper expressed his belief that the powers of the Liverpool Sanitary Amendment Act were more available and less costly in dealing with insanitary areas. The paper concluded with an epitome of the work so far done by the Insatitary Property Committee in removing insanitary areas and erecting suitable cottages on the sites.

Overcrowding.

By H. O. Pilkington, M.R.C.S., L.S.A., M.O.H. for Preston.

Overcrowding is a condition not unfrequently met with in all large towns and cities, and I think it may be taken as an axiom that the larger the town and the greater the amount of overcrowding *i.e.*, the greater the relative amount, the greater the amount in proportion to the population. And this is explained by the fact that to these great centres of industry men and women are gathered from neighbouring towns and villages, and from surrounding and even distant districts.

These go to swell the already teeming population, many of them are in poor circumstances, living from hand to mouth, and often compelled by the exigencies of their work to reside in the centre of the town, where house rent is extravagantly and exorbitantly dear. As a consequence they are compelled to put up with the least amount and cheapest form of lodging accommodation.

In estimating the evils of any one case of overcrowding, many circumstances must be appreciated and borne in mind. Where the house is a tenement house several stories in height, where given areas of ground below and of roof above enclose within their boundaries many different families, where the yard space is in proportion to the area of the house foundations and not to that of the number of persons occupying it, where often the house is situated in a closed-in court provided with an imperfect circulation of air and that not of the purest, the dangers of overcrowding are materially increased, and the cubic space per head, which in other and more favourable conditions might be sufficient, becomes utterly inadequate to the simplest wants of health. And probably the worst of all forms of overcrowding is where a single room, in a tenement house, has to satisfy all the requirements of one, or it may be of more than one family. Where this room is at once the living room, dining room, sleeping room, and, in the case of some members of the family at least, the working room.

We all know the story of the single room in a tenement house in one of the large towns—from what Dr. Hope has said it was probably in Liverpool—which was sublet to four distinct families, each of whom had their allotted portion—their own particular corner. And even here they got on well and comfortably, until the Irish family, in the lefthand corner of the fireplace, began to take in lodgers, with the result that the house became overcrowded, and there was an appeal—probably an anonymous appeal—to the sanitary authority for intervention and redress.

It has been said that the speculative builder—who is too often also the jerry builder—is in one sense a sanitary reformer. At any rate, it is he who runs up the rows of badly-built, but cheaply-rented, houses on the outskirts of large towns, and so, in conjunction with cheap train and tram fares, induces the artizan and labourer to desert the crowded centre of the town, and transport himself and his belongings to the purer air and freer ventilation of the suburbs.

Now, the form of overcrowding just alluded to, which is probably the worst of all, is one happily not often met with in the majority of Lancashire towns. A six years' residence in the Manchester Royal Infirmary (more years ago than I like to think of or care to mention), and an acquaintance with some of the worst slums in that city and in Salford, brought me occasionally into contact with cases of overcrowding something like those I have mentioned, but in the majority of Lancashire towns such a thing is rarely met with.

Speaking of Preston, as the town with which I am best acquainted, I may say that such a condition is never met with, and that overcrowding in any shape is not of frequent occurrence, or rather that where it does exist it generally takes a form which prevents strict official interference.

The most common type is that occurring under something like the following conditions. A working man with his wife, and perhaps two children, take a cottage house, having two rooms below (with a small back kitchen or scullery), and two bed-rooms above, with a small room, a little more than a box-room, over the scullery mentioned. The house is open to the street in front, and has its own backyard behind, often of very limited capacity, but still belonging to this house alone and containing separate closet accommodation. In his present requirements such a domicile is sufficient, but as time goes on his family increases, children are born to him with monotonous regularity, of whom some die as infants but others survive, until at the end of, say, twelve years the family now numbers some nine members, instead of the

original four, if even he has not given house-room to an aged parent, a widowed sister with her child, or some other more or less closely-connected relative. But although his family has thus increased, his income has remained stationary. None of the children, except perhaps the two eldest, are in receipt of wages, and with so many more mouths to feed he must needs economise on all sides, and certainly he thinks that he cannot expend more money on house rent. On the contrary, he is tempted to save something by taking in a lodger, and so the house becomes overcrowded. If the mother is a decent, thrifty, and contriving woman, she will probably do her best by distributing the sleepers in the different bed-rooms, and by putting up screens and curtains to maintain some show of decency. Upon this moral view of the question I have nothing to say, except that police surgeons especially know how many charges of immorality amongst members of the same family are due to the promiscuous mixture of the sexes in the sleeping chambers. If such a charge be true, nothing further need be said of the dangers from such a condition of things; if it be false, it shows with equal force how decency must be blunted and immorality fostered in the minds of those whose very youth should protect them from even the thoughts of such a crime. But looking at the question from a purely sanitary standpoint, there can be no doubt as to the dangers to which young persons, and especially growing children, are exposed through breathing an atmosphere deprived of its oxygen and laden with organic impurities. And this for some hours together, and at a time when the body and its vital organs are exhausted by the labours of the previous day, and so are especially liable to contract disease.

Diseases of the air passages and respiratory organs may well be engendered by such a condition of things, while scrofula, marasmus, and a general condition of impaired vitality and stunted development must be the result. Moreover, there is good reason for believing that amongst adults a craving for stimulants is induced by this breathing of impure air, and that confirmed habits of intemperance may be traced to the physical and mental depression consequent upon living and sleeping in overcrowded rooms. Amongst factory operatives, accustomed to work in a heated atmosphere, nothing is so much feared and avoided as a draught, and, as a consequence, the doors and windows are kept closed, and the chimney, which would otherwise act as an exhaust shaft, is stuffed with a bag, while the fireplace is not unfrequently papered over. Add to this the fact that amongst persons of this class strict personal cleanliness—at any rate, that involving the ablution of the whole body—is very rare, and it will be at once understood that, in addition to carbonic acid, and possibly actual germs of disease, the air must become laden with epithelial scales from the surface and interior of the body, and with dirt from the person and the clothes. In such an atmosphere a plant would not thrive; how can a man maintain his health, and how can an infant be expected to grow up strong and vigorous?

Now the Public Health Act provides that "any house or portion of a house so overcrowded as to be injurious to health is a nuisance," and as such may be dealt with.

It remains for the medical officer of health to form an opinion as to when intervention is necessary, and the only grounds upon which he can proceed are those of injury to health.

But, as a rule, it will be sufficient to represent to the head of the family the dangers to which he and the other members are exposed, and the consequent necessity of his providing more efficient accommodation.

Failing this, an appeal may be made to the landlord, and this will generally be successful, since tenants with very large families are not sought after, it being generally understood that the bigger the family and the more is "taken out" of a house. Moreover, section 109 of the Public Health Act provides that "where two convictions against the provisions of any Act relating to the overcrowding of a house have taken place within three months (whether the persons convicted were or were not the same), a Court of Summary Jurisdiction may order the closing of the house." This is a lever which may be judiciously used to induce the landlord to give notice to the tenants of an overcrowded house.

Certain conditions may give rise to temporary overcrowding in the poorer parts of a large town. When the Militia, during the time of training, were billeted, or rather allowed to obtain their own lodgings, it frequently happened that they herded together in some one-quarter of the town where lodgings were cheap, and landlords not too fastidious as to the sort of guests they entertained. Much the same thing occurs during the summer months in those towns through which the Irish harvesters pass on their way to and from the country farms in which they are engaged, or towns to which they resort at the week end to lay in supplies and pass the Sunday. In most towns again there are certain fairs which bring in a contingent of strangers who usually make for one particular locality in which they have previously been accustomed to find lodgings.

It is, therefore, well that the medical officer of health should bear these facts in mind, and that at such times he should caution his inspectors to exercise more than ordinary vigilance.

The registered common lodging houses are, of course, dealt with in the Public Health Act, which provides that bye-laws may be made by local authorities defining the cubic space which shall be given to each adult sleeper. It remains for the

lodging-house inspector to see that this rule is carried out, and that the sleepers in any one room do not exceed the number for which it has been licensed.

The cubic space allowed varies as a rule from 250 to 300 feet, and is really too small, especially considering the class of persons to whom it is intended to apply, and still more so if the house has not been built for the purpose of a lodging-house, but, as is too often the case, consists of two or more cottage houses more or less inadequately converted.

By the Public Health Act vessels may be treated as houses, and the Nuisance Removal Act applies equally to them. The space provided in the forecastle is generally very small, and it is often so arranged that as one watch leaves for duty another takes the vacant places. The air necessarily becomes foul, but the men have such a superabundance when on deck and aloft that this defect has not the importance which might otherwise be expected. In a less degree this remark applies to canal boats, the cubic space in the cabins of which is not defined in the Canal Boats Act, although there are provisions dealing with the age and sex of the sleepers. Tents and vans may also be inspected and dealt with by the medical officer of health if found to be overcrowded. Here, again, he must use his discretion, and must remember that if the notice served be opposed, he will be called upon to show some injury to health as the ground for his action and interference.

The Education Act deals with the air space to be provided for each child in the elementary schools, but deals so feebly with it as to require only 80 cubic feet per head, an amount evidently and ridiculously too small if even the air could be safely and efficiently renewed.

There is one way in which overcrowded houses act most prejudiciously to the public health, and that is by the facilities given for the transmission of infection and the propagation of zymotic disease. This is especially the case with regard to such diseases as measles and whooping cough, which are capable of conveyance from one child to another before the symptoms are sufficiently developed to warn the parents of the nature of the illness, or to induce them to apply for medical assistance before the rash has shown itself in the one case, or the characteristic whoop has been heard in the other.

Healthy children occupying the same room with one infected, and breathing the same air for some hours, can hardly hope to escape, and this condition of overcrowding becomes an important agent in the propagation of these and kindred infectious diseases.

One good result of the Notification of Infectious Diseases Act, now so universally adopted in one form or another in most large towns, has been that of bringing to light numerous cases of overcrowding—generally in the modified form I have described.

If the patient is not removed to hospital, inquiries are naturally made as to the extent of the family, and the facilities—or rather the possibilities—afforded for isolation. Conditions such as those I have hinted at are often brought to light, and the opportunity occurs for the medical officer of health to put on a little pressure to induce the head of the family to take a larger house, or to arrange for the boarding out of some of the members of the household.

In conclusion, I would say that while gross cases of overcrowding should be firmly and promptly suppressed, the medical officer of health may do a good deal by the exercise of a little tact and discretion in remedying that more frequently occurring condition in which—if even there might be a difficulty in proving actual injury to health—there is good ground for suspecting it, and in which it is often only necessary to point out the danger to ensure its removal. And in estimating the importance of doing this, it is only necessary to remember the absolute importance to the body of fresh air in sufficient quantity, and to reflect that while the sudden and complete deprivation of oxygen will cause almost immediate death, a slower, but equally fatal, result may be brought about by overcrowding.

Discussion.

Dr. SERGEANT said that, judging from Bolton, he should say that insanitary dwellings, such as Dr. Hope described, were comparatively rare in the smaller towns. The results of the 1891 census show that the ratio of population to houses varies considerably in the thirty-three large English towns. Plymouth heads the list with 8·7 per house, Gateshead has 7·9, London, 7·7; Newcastle, 7·3; Sunderland, 6·9; Bristol, 6·2; West Ham, 6·0; Brighton, 5·9; Birkenhead, 5·7; and Liverpool, 5·6 per house; Birmingham, Manchester, and Salford have each 5 per house. The lowest ratio is found at Norwich and Halifax, with 4·4; Huddersfield, Nottingham, Leicester, Derby, Burnley, Bolton, Preston, Sheffield, Oldham, Bradford, Leeds, and Hull range between 4·5 and 4·8. Amongst the towns having the highest ratios are some of the most populous, and some like Plymouth and Gateshead, of a comparatively small size. The towns with the lowest ratios are chiefly the manufacturing towns where the artisans' cottages are so numerous in comparison with the large houses of the wealthy. Amongst the non-county boroughs of Lancashire the ratio is 4·8, or about equal to the ratio in the large English manufacturing towns. There is apparently no correspondence between the number of persons to a house and the height of the infantile or zymotic death-rate.

In the towns with the highest ratios of house occupants the following rates were recorded:—

	Infantile Mortality.	Zymotic Death-rate.
London	164	2·2
Gateshead	170	1·9
Newcastle	174	1·6

Preston, with an average of 4·8 persons per house, had an infantile rate of 269, and a zymotic rate of 2·8. The same conclusions will be arrived at by comparing the rates of many of the non-municipal towns of Lancashire. These facts tend to show that in considering the conditions affecting the health of a town the ratio of house occupation has to be studied in conjunction with the character of the residences and the trade and social status of the inhabitants.

Dr. KENYON asked if Dr. Sergeant had noticed that the number of rooms was also given in the census. He said that if the calculations were made on the number of rooms very little difference would be found in the various towns.

It was proposed by Dr. KENYON, and resolved, that the further discussion of the papers be adjourned until the July meeting.

The meeting terminated by a vote of thanks to the readers of the papers.

THE CO-OPERATIVE TRIP TO BUDA-PESTH.

THE arrangements for a co-operative trip to Buda-Pesth, which have been foreshadowed in previous issues of PUBLIC HEALTH, are now complete, and every member of the Incorporated Society of Medical Officers of Health will have received a circular detailing these arrangements.

The congress opens on Sunday, September 2nd, and the party will start from London early in the preceding week.

FIRST DAY.

Leave London, Holborn Viaduct, for Dover 9.55, leave Dover about 12.30 p.m., *via* Ostend, arriving at Cologne at 11.47 p.m.

SECOND DAY.

The morning may be spent in seeing Cologne. After lunch the party will proceed by rail along the bank of the Rhine to Frankfort, which will be reached about 5.30 p.m.

THIRD DAY.

The morning may be devoted to a tour of the principal sights of Frankfort. After lunch the party will leave by train for Nuremberg, which will be reached at 8 p.m.

FOURTH DAY.

The whole day will be spent at Nuremberg, one of the oldest and most picturesque mediæval towns of Germany.

The party will leave Nuremberg by night train for Vienna.

FIFTH DAY.

Arrive at Vienna at 6.45 a.m.

SIXTH DAY.

The party will leave Vienna by rail at 8.5 a.m., arriving at Buda-Pesth at 1.25 p.m.

At the conclusion of a five days' stay at Buda-Pesth, members can prolong their stay indefinitely by making their own arrangements with the hotel proprietors. The only conducted parties on the return journey will be those leaving Buda-Pesth at the conclusion of the five days' stay, in accordance with the itinerary.

ELEVENTH DAY.

Leave Buda-Pesth at 8 30 a.m., arriving at Vienna at 1.55 p.m. The whole of the remainder of this day, and the whole of the

TWELFTH DAY

will be spent in Vienna, giving members of the party an abundance of time to see this city and the suburbs.

THIRTEENTH DAY.

Leave Vienna at 8.20 a m., arriving at Munich at 6.39 p.m. The

FOURTEENTH DAY

will be spent at Munich. Those who wish to visit Innsbruck and the Austrian Tyrol will leave the party here.

FIFTEENTH DAY.

After an early breakfast the party will leave Munich direct for Mayence, which will be reached late in the evening.

SIXTEENTH DAY.

A full day is arranged for at Mayence in order to give the members of the party an opportunity of visiting Wiesbaden, which is only half-an-hour away by rail.

SEVENTEENTH DAY.

After breakfast the party will leave Mayence at 9.30 a.m. by steamer down the Rhine. At Bonn the journey will be resumed by rail viâ Cologne for Brussels, which will be reached about 9.30 p.m.

EIGHTEENTH DAY

will be spent in Brussels, and members of the party will leave Brussels for London as they may prefer.

A supplementary tour to Innsbruck, the capital of the Austrian Tyrol, has been planned, and can be taken after leaving Munich.

It is advisable that all members of the society intending to join the party, which already comprises a considerable number of medical officers of health and ladies, should send their names to Mr. T. H. Bishop, care of Dr. Lunn, 5, Endsleigh Gardens, N.W., from whom all further particulars may be obtained.

THE INFLUENCE OF DIFFERENT SOILS ON PATHOGENIC MICROBES.—From experiments on sterilised soils described by Dr. R. Dempster, Cobb Research Scholar, at the May meeting of the Royal Medico-Chirurgical Society, it appears that white crystal sand, yellow sand, and garden earth have no marked favourable or injurious action on the life of the comma and typhoid bacilli, the length of life of these organisms in the soil depending chiefly on the amount of moisture present. Peat, on the contrary, is very deadly to both the comma bacillus and the typhoid bacillus. Peat was the only one of the four soils experimented upon which exercised a distinct destructive action on the organisms, independently of the amount of moisture present. Peat soil further acted as the best filter. It was possible for the organisms to be carried through two and a-half feet of porous soil by a current of water.

Public Health.

THE CAUSE OF THE INCREASE OF MORTALITY FROM DIPHTHERIA IN LONDON.

By John F. J. Sykes, D.Sc., M.D.,
Medical Officer of Health, St. Pancras, N.W.

In both England and London the mortality from diphtheria was less in the decennium 1871-80 than in 1861-70, but in the decennium 1881-90 it was greater than in the second, and in London had increased to a higher ratio even than in the first decennium. Comparing London to England, in the first decennium the ratio of mortality was about 5 per cent. lower than in England, in the second was about equal, and in the third it was about 60 per cent. higher.

Dr. Longstaff, in his paper on "The Geographical Distribution of Diphtheria in England and Wales," in the extra supplement to the report of the medical officer of the Local Government Board for 1887, found the death-rates from diphtheria per million of population, according to density to be as follows :—

Districts according to density of population.	1855-60.	1861-70.	1871-80.
Dense Districts.....	123	163	114
Medium Districts.....	182	164	125
Sparse Districts.....	248	223	132

The noticeable feature in these figures is that a progressive diminution in the mortality from diphtheria appears to have been taking place in rural districts, being most marked in the most sparsely inhabited.

Dr. Thorne Thorne, medical officer of the Local Government Board, in his work upon diphtheria, published in 1891, showed that since 1871, whereas the annual death-rates from all causes, from the seven principal zymotic diseases, and from enteric fever, have been steadily falling in England and Wales, in the large towns, and in London, the annual death-rates from diphtheria have been rising slightly in England and Wales, more markedly in the large towns, and most markedly in London.

Epidemic Fluctuation.—In searching into the cause of this apparently persistent and progressive increase of the mortality from diphtheria in London, the first point that strikes one is that, unlike that of scarlet fever, the mortality of diphtheria is not subject to great epidemic fluctuations, but, like that of typhoid fever, it is comparatively steady, as Diagram I. shows.

This diagram also shows that whereas the mortality rate of diphtheria is steadily rising, that of typhoid is equally steadily falling *pari passu* with improving sanitation, and that that of scarlet fever is also falling *pari passu* with increased hospital isolation, no hospital accommodation having been provided for diphtheria until the end of 1889.

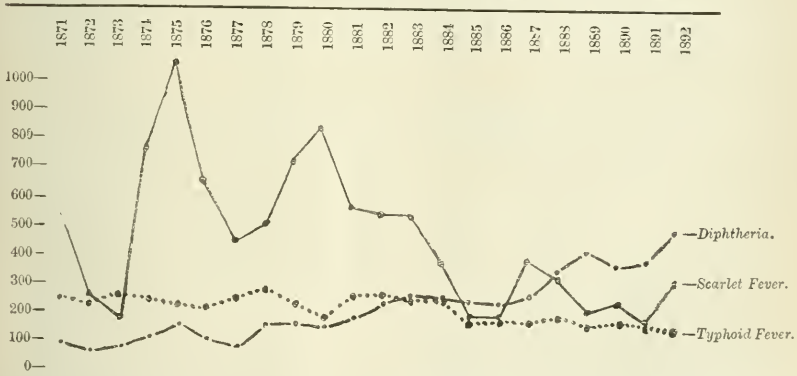
It is important to note these points because diphtheria resembles scarlet fever in its power of spreading directly from person to person, and also resembles typhoid fever, in that either diphtheria, or some form of throat disease closely allied with

Diagram I.

LONDON.

Curves of Annual Death Rates per Million Living.

From the Registrar General's Annual Summary of London and Great Towns.



it, may arise from certain insanitary conditions. Comparing the two last diseases, whereas typhoid only occasionally spreads directly from one person to another, diphtheria always spreads with great facility from person to person; and whereas typhoid varies in direct proportion to insanitary conditions, the relationship of diphtheria to insanitary conditions is overwhelmed by the influence of personal infection. So that, whereas the improvement of sanitation markedly decreases the mortality of the former, it appears to have no effect upon the latter; and whereas the increase of general density of population in all districts, of special density in towns, and of aggregation in schools, only remotely and indirectly affect typhoid, they closely and directly affect diphtheria.

Dr. Thorne Thorne has called marked attention to the special incidence of diphtheria in children attending schools, and concludes "that apart from age susceptibility, 'school-influence' so called, tends to foster, diffuse, and enhance the potency of diphtheria, and this, in part at least, by the aggregation of children suffering from that 'sore throat' which commonly is prevalent antecedent to, and concurrently with, true diphtheria." The period of life at which there is most susceptibility to acquire diphtheria is from 3 to 12 years of age, and school attendance increases the risks of personal infection by the aggregation and prolonged association of children together.

School Attendance.—The progress of educational legislation traces the progressive increase of elementary education, and of school attendance.

In 1870, the Elementary Education Act was passed for the establishment of School Boards and elementary schools.

The Act of 1872 empowered the London School Board to borrow money and to erect further offices.

By the Elementary Education Act of 1873, any out-relief given to the parent or guardian of a child aged from 5 to 13 years, was made conditional on the child receiving elementary education.

In the Act of 1876, a child was defined as a person between the age of 5 and 14 years. A certificate of proficiency or of due attendance at school was required for the employment of a child over 10 years of age, and further provision was made as to the employment and education of children in factories, 250 attendances being necessary; and for the payment of school fees for poor parents, 350 attendances being necessary. An order of the Court was made obtainable for enforcing the attendance of a child at school. Day industrial schools were established. An increase of the Parliamentary grant was made. School attendance committees were given power to make bye-laws like school boards, and to appoint local committees.

The Act of 1880 compelled bye-laws to be made by every school attendance committee, under section 74 of the Act of 1870, respecting the attendance of children at school, and prevented children from 10 to 13 years of age being employed previous to reaching the standard fixed by bye-law.

By the Education Code Act, 1890, a special grant of £10 annually was made to schools where the population was less than 500, and "elementary education" was not to be the condition of a Parliamentary grant to evening schools.

By the Elementary Education Act, 1891, schools in which the fee for each child from 3 to 15 years of age did not exceed 10s. a-year, were allowed a free grant of that amount and rendered free.

The average number of children on the roll of the London School Board annually gives a more definite idea of the increase of elementary education in London.

Whereas during the decennium 1861-70 the number of deaths from diphtheria decreased annually, during that of 1871-80 they increased annually, and in similar proportions. Comparing the number of scholars on the roll of the London School Board, the influence of elementary education appears to have had some effect in producing this result. But on scanning the yearly figures of the decennium 1881-90, it is to be observed that there are two suddenly pronounced and permanent increases in the number of deaths, the first extending from near the beginning of the decennium to 1887, and the second from that year to the end, and continuing into the next decennium.

These increases are seen clearly on referring back to Diagram I.

These distinct and permanent increases in the number of deaths from diphtheria are out of all proportion to the increase of population and of scholars, and the last is more or less coincident with the commencement of notification of diphtheria, and of the admission of the disease to the hospitals of the Metropolitan Asylums Board. The mortality from diphtheria in the hospitals of the Metropolitan Asylums Board was falling during this period, as shown by the following table:—

Year.	Admissions.	Deaths.	Mortality per cent.
1888 (2 months)	89	46	59·35
1889	722	275	40·74
1890	942	316	33·55
1891	1,312	397	30·03
1892	2,009	583	29·35

The hospital cases were therefore not the cause of the increase in the number of deaths from diphtheria in London.

Connection with other Throat Affections.—These peculiar increases led me to examine more closely the statistical figures in relation to diphtheria, and to compare those relating to other diseases attacking the palate, uvula, tonsils, pharynx, larynx, and trachea. It was not possible to go further back than the beginning of the last decennium as previous to 1881 the Registrar-General gave no details of deaths occurring from these diseases in London.

Such an examination shows that there has been

a very marked fall in the number of deaths from thrush and croup, a distinct but less marked fall in those from laryngitis and other diseases of larynx and trachea, and an irregular and slight decrease under the head of sore throat, only observable on comparing the quinquennium 1881-5 with that of 1886-90. All these diseases, taken together, show progressive and very distinct fall in the number of deaths attributed to them. Diphtheria, on the other hand, shows a progressive and distinct rise, in fact, when compared side by side, *the numbers of the two classes proceed in inverse ratio, and when the two classes are totalled together any increase disappears.*

Thinking that the influence of age incidence might have affected the result, I extracted the deaths from the several diseases and classified them in two categories, under 15 years, and 15 years and over, the incidence of diphtheria being greatest under 15 years. The result showed how little the numbers of deaths at 15 years of age and upwards affected the totals.

The progressive increase of mortality attributed to diphtheria and the equally progressive decrease of mortality due to other throat diseases in London are distinctly shown in Diagram II., the inverse ratio in the progression being so well marked and corresponding so closely that the total of the two classes of diseases shows no progressive variation, until the means of the two quinquennia are compared, and then it appears that *the mortality from all throat diseases taken together is decreasing, a result for which the increase in diphtheria mortality had scarcely prepared us.*

The conclusions that I have therefore come to are:—

(1) That a slight diminution is taking place in the death-rate from throat diseases taken as a whole; and

(2) That the great rise in the mortality from diphtheria corresponds with a great fall in that from other throat diseases.

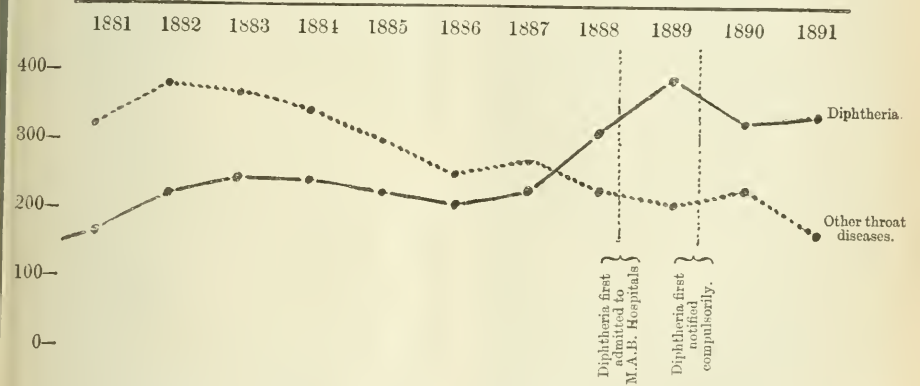
As to the former, it may be due to diminished prevalence, or to greater vigilance, or to better treatment. Parents, guardians, teachers, nurses, medical men, and the public generally are more alive to the danger of throat diseases than formerly. As to the latter, many causes are possibly at work, and a few words may be devoted to each.

1. *The effect of the Infectious Disease Notification Act.*—This Act came into force in the metropolis at the end of October, 1889, and has tended to more care and attention being bestowed, not only upon diphtheria, but upon all infectious diseases. On referring to Diagram II. it will be noticed that the great rises in the diphtheria mortality curve of the last decennium took place from 1881 to 1883, and from 1887 to 1889, antecedent to the introduction of compulsory notification, and that the persistent and gradually progressive fall in the mortality curve of other throat diseases commenced in 1883, seven years previous to the introduction of compulsory notification into the metropolis. Furthermore, during the past decennium there have not been any rises in the mortality from other notifiable diseases comparable to that of diphtheria. It will be observed also that my conclusions are

Diagram II.

LONDON.

Curves of Annual Death Rates per Million Living.



not based upon notifications but upon deaths, that the fatal, not the benign, forms of disease are in question.

2. *The Effect of the Reception of Cases into the Hospitals of the Metropolitan Asylums Board.*—It will be unnecessary to discuss here the question of the effect of the Board's hospitals upon diphtheria, raised in the interesting paper of Mr. R. D. R. Sweeting upon "Post-Scarlatinal Diphtheria in the Transactions of the Epidemiological Society, 1892-3," nor the etiology of the various forms of diphtheritic throat affections treated so fully and with such exactitude by Dr. Klein in the supplementary Reports of the Local Government Board, seeing that it has already been shown by figures from the Asylums Board's own reports that the mortality of diphtheria cases admitted diminished in each succeeding year. It may be that the admission of cases to hospital may have had some slight indirect effect in directing more care and attention to sore throats, but the upward tendency of diphtheria commenced prior to this date, and therefore this effect would be only part of the generally increasing attention already being paid to the disease.

3. *The Effect of Sanitary Legislation Generally.*—This must also be taken into account, for the Public Health Act, 1875, came into force during the very decennium when compulsory education came into force, and the effect of the Act was to stimulate the recognition and prevention of infectious diseases in England, especially in large towns. This stimulus, doubtless, extended to the metropolis, and, in conjunction with additional sanitary legislation, directed closer attention to infectious diseases in London also.

4. *The effect of Elementary Schools.*—Dr. Thorne Thorne has so fully and so carefully entered into this subject that his conclusion that increased school attendance has had a material influence in increasing the spread of diphtheria is irresistible.

5. *Alteration in Classification.*—Any changes made in classification by the Registrar General are usually commenced at the beginning of a decennium, and therefore would not affect the detailed London figures of throat diseases in this report. The Superintendent of Statistics, Dr. Tatham, has kindly informed me that "membranous croup" was not classed with diphtheria until the commencement of the present year (1894), although "diphtheritic croup" has been classed with diphtheria for a long period, so that classification can have had little or no effect upon the returns of mortality.

6. *Variation in Nomenclature.*—Improved medical diagnosis, due to improved medical education and increased knowledge of diseases of the throat, enables these diseases to be more readily differentiated than formerly. Now, most forms of infectious sore throat are regarded as diphtheria, and the fatality of such diseases is recognised, whereas formerly the term was restricted to typical cases. The danger of the earlier practice has been pointed out in the many instances brought to light in which apparently simple sore throats in schools have culminated in serious and fatal epidemics.

7. *Change of Type.*—In the last place, the question may be seriously asked whether the variation in nomenclature may not be due to a change of type in disease of the throat. Dr. Thorne Thorne says "that there is reason to believe that attacks of so-called sore throat exhibit, under certain favouring conditions, a progressive development of the property of infectiveness, culminating in a definite specific type which is indistinguishable from true diphtheria." A change of type is probably taking place as the result of increased density of population, especially in towns, more particularly of the aggregation in schools, and of the effects of personal infection consequent on these There is also a strong probability, and it only remains to be definitely proved, that a sore throat caused by insanitary or other conditions, may possess or acquire infective properties, and in passing from person to person may also acquire such virulence as to cause death from infectious sore-throat of a type which the clinician would certify as diphtheria, whatever the pathologist might declare it to be as the result of bacteriological examination.

DIPHTHERIA AT OXTED.*

By C. E. Oldman, M.A., M.D.Cantab., Medical Officer of Health.

The first case occurred early in the year, during April, at the Rectory Lodge, and had, apparently, origin in the surroundings of the house. The small dip-well, from which the drinking water was derived, was much exposed to the danger of being contaminated with the dust and dirt from the ground in its vicinity, where numerous fowls were kept and had liberty to roam, being unprovided with a covering of any kind.

The school being closed for the Easter holidays, no risk of extension by that means existed, and no other case occurred, even in the family. The next case appeared in July, and was the commencement of a series, which ultimately assumed epidemic proportions and involved a number of deaths. The following is an abstract from a special report, made at the time, and fully describes the circumstances attending the outbreak:—

"In consequence of the Notification Act not being in force in this district, some days elapsed after the first case occurred in the above outbreak before I became acquainted with the fact that diphtheria existed at Oxted at all, and then on July 5th, on my visiting the spot, to my surprise, I found it extensively prevalent and fresh cases

* From Dr. Seaton's Annual Report for the County of Surrey, 1893.

occurring daily, so that it became an urgent question that immediate steps should be taken to arrest the progress of the epidemic.

"Finding on inquiry that the disease was at that time confined exclusively to children, and especially those attending the infant school, I advised that it should be at once closed, which was done that day, and in consequence of fresh cases still occurring during the next two days, the large school was closed also.

"The first known cases as regards date of illness of the series was that of a boy aged seven, living in a house amidst fairly good surroundings, and attending the infant school, whom I will call A. He came home from school on June 23rd not feeling well, and as he was the subject of a chronic inflamed throat his mother kept him at home, but did not send for a doctor. After being in bed one day and feeling better, he was allowed to get up, and being at home doing nothing, his mother set him to nurse the baby. On June 30th the baby fell ill, and was pronounced by a doctor to be suffering from diphtheria, which proved fatal on July 4th, forming A (2) in the series, which suggests the probability that the illness of the brother who nursed him was also diphtheria. No further mischief appears to have accrued from these two cases.

"In the interval, other cases occurred on June 24th, 25th, 28th, 29th, making B, C, D, and E of the series, which showed no immediate connection with one another, except that they attended the infant school, B dying on July 6th and C on July 7th.

"From July 1st onwards, fresh cases were of daily occurrence until July 12th, making 29 in all up to that date, but some were doubtless contracted in the houses amongst the members of the families of the first cases and not due to school influence, inasmuch as all children from infected houses were kept from school as soon as any member thereof was pronounced by a doctor to be so suffering. At this period the closure of the school on July 5th began to show its influence on the progress of the epidemic, with the result that one fresh case only occurred on July 17th, and two on the 16th and 17th (the latter being traced to contagion probably conveyed direct by means of a toy which had been used by a convalescent from the disease), other than in houses previously containing a case.

"Now taking into consideration the salient features of the outbreak, the points which at once attract attention, are—

1st. That it was confined to children living widely spart.

2nd. The cases followed one another in quick succession, and at only two or three days' intervals, indicating probable infection by close or personal contact with each other, which in the case of children living at a distance, could probably only be effected by their meeting together for some common purpose such as

3rd. Attending school, and

4th. Being chiefly amongst children under nine years of age, probably therefore in

5th. The infant school,

so that closing the school at once seemed likely to be of use in arresting the progress of the epidemic, a suggestion which I have previously said was readily adopted.

"With a view to, if possible, ascertaining the source from which the epidemic arose, I visited the schools first and made a close inspection of them in company with the Sanitary Inspector. The sanitary arrangements consisted of three earth closets for the infants and girls, and two more, together with a urinal, for the boys. These earth closets were defective, and being without the usual supply of earth, were offensive in consequence. They were, however, usually emptied at regular intervals by someone specially engaged for the purpose—who also flushed the urinal at the same time. The water supply was from a well from which a sample was taken, and on analysis proved to be unfit for drinking purposes. There being no lavatory, the drainage merely provided for the conveying of the rain water by pipes into a neighbouring ditch. These surroundings, though unsatisfactory and highly injurious to the health of the children frequenting she school, and whose average attendance was about 160, would probably influence both schools alike, and would therefore scarcely justify the conclusion that they were the source of an outbreak of illness which affected exclusively the children in the infant school; consequently, the probability arises that the disease was imported from without, and that the influence of the school was merely instrumental in its propagation and extension. On comparing, too, the dates upon which the children fell ill with those of their attendance at school as marked in the register, it is to be noted that some were at school during the day, or part of it, upon which they afterwards fell ill, which in the case of an illness like diphtheria would mean that such children would be a source of infection to others during those school hours, extending even to the books, drinking cups, and other articles which they individually might make use of. Several children, too, were in the habit of bringing their dinners with them and remaining during that hour instead of going home, being provided with bottles of tea or other beverages. These bottles were frequently passed from one to another, and sometimes made use of by other children than their owners, for obtaining water from a pail provided for the pupose, wherewith to quench their thirst, thereby affording a ready means of conveying infection; and it is even reported that sometimes they drank from the pail direct, which would still further favour its transmission.

Pursuing my investigations outside the school boundaries, two possible sources presented themselves—

1st. An accumulation of filth and sewage in a field close to the road and not far from the school, arising from the drainage of several houses in the village and immediately opposite the cottage where one of the earliest cases resided, marked C in the series. The parents of several of the children agreed in saying that this field formed a convenient playground for their children, and that they often came home complaining of the smells arising from this accumulation of sewerage, which being in close proximity to the road was also noticed by the teachers and others as they passed to and from school, particularly during the very hot weather. Here it was that case A, who, as I have previously mentioned, has a chronic inflamed throat, frequently stayed on his way home and played with his intimate friend C, who lived opposite, and being somewhat specially susceptible by reason of the condition of his throat may have contracted the disease there and conveyed it to his friend and others near him during school time. He also took his dinner to school, and admits having frequently lent his drinking bottle to others, and was one of those who attended school during the day upon which he afterwards fell ill, and would be in an infectious condition probably.

2nd. Inquiry into the circumstances attending the illness of the seventh case maaked G in the series, showed him to be living in one of the houses in the Station Road called Marsland Cottages, upon which I have on a former occasion been obliged to report unfavourably. A little boy, aged six, who attended school on June 30th, was taken ill, and pronounced to be suffering from diphtheria on July 2nd, which proved fatal on July 7th. For some days previous to this illness an older brother, aged eight, who also attended the infant school, had been ailing and not feeling well, but not sufficiently ill in the estimation of the parents to suggest their sending for the doctor. His mother, who was confined on June 14th, states that this general ailing of this boy commenced about a week after that date, by which she is able to fix it, but she still kept sending him to school, and the register shows that he did so attend, with an occasional absence for half a day. He, however, became so far worse as to be in bed one day during the week ending June 30th, but got fairly well by the time his brother fell ill. There is little doubt but that he suffered from the disease, and his present condition shows it also by one very significant symptom, viz., absence of the patellar reflex, so that the inference is that he not only conveyed the disease to his younger brother, but probably to other children during his attendance at school also, and this clearly early in the outbreak. Corroborative evidence of this view presents itself in the explanation of the following case, which occurred later, and amongst children attending an altogether different school. In the Station Road there is an institution called the Laleham Orphanage for Girls, which children are in the habit of attending Limpsfield School and not Oxted. One of these children fell ill and was pronounced to be suffering from diphtheria on July 10th. It appears, however, that the matron of this orphanage is in the habit of holding a Sunday-school in a room elsewhere in the Station Road, and that this boy was one who usually attended that school, and in fact did so attend on the last day upon which they met, viz., July 2nd ; and further that this girl was specially deputed to sit near, and take charge of him during school time, which very plainly indicates the source of infection in her case, and confirms the probability of his infectiousness. Reverting to this boy's home I find that so far back as March 31st, 1892, I reported to the sanitary authority on this block of cottages as follows :—

"The closets drain in a cesspool with an overflow into a disused well without any ventilation. The larders are back to back with the closets, and though provided with flushing tanks they are defective and incompetent, admitting of the accumulation of soil in the pans."

On the day of my last inspection (July 5th, 1893) they were in the same condition, and the water had been cut off from the flushing tanks altogether for some time past, the sink gully was full, and I was informed that during heavy rains the sewage frequently regurgitated and stood several inches deep around the gully. The cesspool is situated within four feet of the dwellings, and the rain water pipes simply lead into a hole in the ground, and the water is allowed to soak away. Here then are surroundings decidedly favourable to the development of diptheria, and doubtless the prolonged dry season would materially enhance their influence by favouring the natural upward tendency of the ground air which would be mingled with the emanations arising from this saturated condition of subsoil. Evidence of this, too, is to be seen in the staining on the walls of the larder, which I am told is even sometimes offensive in consequence. Milk and food kept under such circumstances would prove a fertile soil for the development of diphtheria.

These two sources seem sufficient to account for the introduction of the illness amongst the children attending the infant school, and to be then propagated and distributed by that influence, so that closing the school proved an effective measure in arresting the further progress of the epidemic.

No further cases occurred until September, on the 18th of which the school was reopened. On the assembling of the children I attended and carefully examined their throats, in which my partner, Mr. Furber, kindly assisted me, with a view to the rejection of any child we thought not well or who had any symptoms of throat illness, and although scarcely one in ten had a healthy throat, there were none that we could exclude as likely to develop diphtheria. During the period in which

the school was closed a complete reconstruction of the sanitary arrangements was carried out. Cases occurred subsequently, but they were apparently unconnected with school attendance, and were for the most part amongst members of families living in close proximity to houses where cases had occurred previously, or who had been brought into close contact with children who had previously suffered during the epidemic, but had apparently recovered. And as the power of infecting others persists in the throat of a sufferer from the disease for a variable period, it is possible these may have contracted their illness in that way. The total number of cases were 56, with 11 deaths, being a mortality of 19·6 per cent.

The sanitary condition of Oxted generally is one which would tend to favour the development of such a disease as diphtheria or its recrudescence after being suppressed by energetic but temporary measures. Their being no system of drainage, the houses are for the most part provided with ordinary privies, which are of a bad type of construction. Being made of wood with vault directly under the floor and seat, they are a source of danger to those using them, and although doubt has been cast upon the general opinion that diphtheria has its origin in such like conditions of offensive excremental accumulations, still these act injuriously upon the health of the community by lowering their vitality, and by developing throat illness, which would render the subjects of it the more susceptible to the infection when presented to them, and diminish their power of resistance to its invasion.

It has been said on authority that diphtheria never attacks a healthy throat, but one rendered unhealthy by previous illness.

The above conditions are eminently calculated to produce such an illness from time to time, and thus indirectly produce the diphtheria. The pail system would be a better substitute pending the completion of the drainage scheme which is in progress of being promulgated for Oxted in conjunction with Limpsfield, and specially for those cases which cannot by their position be embraced in it. The adoption of small pails would not be attended with much expense, and being readily emptied would not prove a source of pollution to the general atmosphere as the present privies are.

The accumulation of filth and sewage matter in the field near the school alluded to above has been removed, and the drainage from the cottages improved. The defects also mentioned in connection with Marsland Cottages have been remedied.

And as regards the school, a supply of water from the Limpsfield and Oxted Company has been substituted for that of the well, and the trough system of water-closets has been adopted in place of the earth closets hitherto in use, together with an improved system of drainage, in accordance with my suggestions.

REPORT ON CASES OF DIPHTHERIA ARISING AMONGST SCARLET FEVER CONVALESCENTS DURING 1893.*

By Dr. GODALL, Medical Superintendent of the Eastern Hospital, Metropolitan Asylums Board.

DURING 1893 there were ten cases of post-scarlatinal diphtheria, of which six were fatal. They occurred in four of the permanent wards and two of the huts. There are ten permanent wards and three huts, so that six wards and one hut escaped. In 1892 only one ward and one hut escaped.

Case 6 was infected by case 5, case 10 by case 9, and case 9 by case 8. Seven cases remain, therefore, whose origin is sought. First, with respect to the influence of overcrowding; cases 1, 4, and 8 occurred in wards in which the floor space per bed was considerably below the amount that, in my opinion, should be allotted to fever patients; on the other hand, cases 2, 3, 5, and 7 occurred in wards in which upwards of 144 square feet were allowed per bed. Between the occurrence of cases 1 and 2 Patience ward had been thoroughly cleaned and painted, and the beds reduced to what I consider the proper number. Hope, Courage, and Temperance wards had all been treated in like manner during the second quarter of the year. The avoidance of overcrowding has therefore not absolutely prevented the occurrence of diphtheria in some of the wards; but it is to be noted that, comparing 1892 with 1893, fewer wards were attacked, and fewer instances of the disease (both absolutely and relatively) arose during the latter than during the former year, even when the cases of measles set down in the 1892 table are excluded.

The existence of some defect in the drainage system of a ward is by some considered to be a frequent cause of these cases of diphtheria, but I could not find any such in connection with the cases under discussion. If the drainage system was at fault one would expect to find more cases of secondary sore throat (including diphtheria) than actually have occurred. The number of these cases (over and above the ten cases of diphtheria) was by no means excessive†; four occurred in Patience ward, three in Fortitude ward, and two in each of the other permanent wards, except Temperance, Gladness, and Faith, in which wards there were no cases. Of the three huts there were three cases in Charity, four in Joy, and none in the West hut, which, however, was only in use for a little over three months. Of these 24 cases of secondary sore throat two only (in Charity, on December 7th and 9th) occurred in connection with an outbreak of diphtheria. The charge nurse of Fortitude ward

* From the Annual Report for 1893 of the M.A. Board.

† It must be remembered, however, that a large number of convalescent patients over three years of age are transferred to the Northern Hospital.

had a mild attack of diphtheria, which commenced on October 26th; Fortitude is below Courage ward, in which two cases of diphtheria had arisen two or three weeks before; but I could not trace the nurse's attack to these, and no cases of diphtheria broke out amongst the patients in Fortitude. The two cases of secondary sore throat in that ward occurred on August 10th and November 5th, both were very mild cases.

Nor do I believe that diphtheria is carried from the diphtheria to the scarlet wards by the air, by the drains, or by members of the staff. With respect to the drains, it is to be observed that Joy hut, in which, in spite of its being overcrowded, no case of secondary diphtheria has occurred since its erection in July, 1892, is the nearest of all the scarlet wards to the diphtheria block; and the drains from this hut run into the same large drain into which (nearer its termination in the main sewer outside the hospital) the drains from the diphtheria wards are conducted. But there is another way open for diphtheria to gain an entrance into a scarlet fever ward, viz., by direct introduction by means of patients suffering from the disease. In 1892 the only case of secondary diphtheria that occurred in Charity hut was due to a case of diphtheria which had been admitted as scarlet fever, but which was found after a day or two to be diphtheria pure and simple. Case 3 (in the 1893 table) may also have been caused in the same way. A little girl was admitted into Hope ward on July 29th, certified to be suffering from scarlet fever; no rash was to be seen (it was stated to have been present on the 21st), but there was slight desquamation. There was deposit only on the uvula and both tonsils, which, however, became distinctly membranous by the 31st, on which day the patient, being suspected of having diphtheria and not scarlet fever, was removed to a separate room; three weeks later she again had a membranous inflammation of the fauces and nasal passages, from which she recovered. In my opinion she had diphtheria with a relapse, and I think she was very possibly the cause of case 3. In the remaining cases (1, 2, 4, 5, 7, and 8) no such obvious cause was to be found. In my report to you last year I suggested that diphtheria may have been introduced into the wards by patients who were suffering from diphtheria and scarlet fever combined, the symptoms of diphtheria being masked by scarlet fever; but this view must, I think, be abandoned; for though, no doubt, a considerable number of scarlet fever cases will be found to have a condition of throat differing little or not at all from what is seen in many cases of diphtheria, yet clinical and bacteriological observations go to prove that such cases are not true diphtheria; it is very rare to see them accompanied by "croup," or followed by paralysis; and if the exudation upon the fauces (which may be membranous) be examined, the bacillus diphtheriæ is very rarely found. Such cases must be looked upon as scarlet fever pure and simple, and I cannot attribute to them the instances of secondary diphtheria occurring in the scarlet fever wards.

But though diphtheria is not likely to gain an entrance into a scarlet ward either by means of obvious cases or under the disguise of scarlet fever, it may perhaps creep in undetected in a much more subtle way. Children are frequently sent up to the hospital certified to be suffering from scarlet fever, with the history of having had a sore throat and rash a few days or even a week or two before; on arrival no rash is to be seen, there is no desquamation, and some parts of the fauces (usually the tonsils) are slightly ulcerated. Sometimes these cases demonstrate that they are not scarlet fever by developing that disease in the hospital, and I think it may be fairly suggested that some of them are very mild cases of diphtheria, perhaps at a late stage of the disease. That, apart from symptoms, and as far as naked eye appearances are concerned, diphtheria may occur in these unrecognised forms has been demonstrated incidentally by Dr. Sidney Martin* in his well-known researches on the pathology of diphtheria. No doubt it would be comparatively easy to ascertain whether there is any truth in this suggestion by isolating all these doubtful cases instead of sending them into a scarlet fever ward; but the number of isolation beds available when the hospital is full (as it has been for the last two years) is quite inadequate for this purpose.

THE IMPORTANCE OF THE BACTERIOLOGICAL DIAGNOSIS OF DIPHTHERIA.†

By Francis J. Allan, M.D.Edin., D.P.H.Camb., M.O.H. for the Strand District.

In reference to the great increase of diphtheria in London, the questions which seem to me to require answering are:—

1. What are the conditions which favour the growth of the bacillus?
2. What steps should be taken for its prompt recognition? and
3. For the prevention of the further spread of the disease?

The solution to both the first and the last of these questions depends upon the prompt recognition of the disease, because, unless the diagnosis is correct, any conclusions which may be drawn must necessarily be fallacious. Without demonstrating the presence of the bacillus of diphtheria in each case, it is frequently impossible to say that a membranous inflammation of the throat is the true disease, and on the other hand cases have been recorded in which the bacillus has been found, while the symptoms and appearances were not at all characteristic. The necessity for making cer-

* Report of medical officer to Local Government Board for 1891-92, page 148, case 1.

† From Dr. Allan's Annual Report, Strand District, 1893.

tain has been recognised by the New York Health Department, who have issued a circular* to medical men there explaining the arrangements made for this purpose. They say: "The differential diagnosis between true and false diphtheria can be made by bacteriological examinations within twelve hours, while without their assistance it is difficult or impossible. The Health Department is now prepared to make use of bacterial cultures in all cases of suspected diphtheria." The circular then proceeds to say that the medical man in charge may obtain the necessary culture tube free of cost from various centres, to which he will return it after inoculating it from the suspected throat, and the tubes will be daily sent on to the department from the local centre, or an officer of the board on receiving a request will attend and make the inoculation. By noon on the following day the medical man receives the result of the culture by telephone or through the post.

There is no reason why this example should not be followed in this country. The expense of carrying it out would be trifling compared with the outlay entailed when a throat affection is true diphtheria, or is supposed to be so. In London the Metropolitan Asylums Board would be the proper authority to take this matter up, and arrangements might be made with some central bacteriological laboratory to provide the culture tubes and make the cultivations. A supply of tubes might be kept at the offices of the boards and vestries, and each medical officer of health would deliver them to medical men applying, and would receive the report of the bacteriologist next day and convey it to the medical man in charge.

But I would go further than this, and require that no case should be allowed to be removed from isolation, either in hospital or at home, until it had been proved that the throat were free of the bacillus, because it has been shown that virulent diphtheria bacilli may be found for an indefinite time after the apparent cure of the malady, and infection may be spread thereby. Especially in cases treated at home, I am inclined to the opinion that the patients are allowed to mix with healthy person at too early a stage, but, without the definite evidence given by finding the bacilli still there, it would be difficult for a medical man to insist on further isolation when the patient was to outward view apparently well. If diphtheria is to be stamped out, I feel sure that greater insistance must be laid on this point before disinfection of premises and clothing are carried out.

Conference on Small-pox and Vagrants.—The Public Health Committee of the London County Council have decided to convene a conference of urban sanitary authorities, to be held during July at Spring Gardens, to consider whether any measures can be taken to restrict vagrants as agents in the spread of small-pox and other infectious diseases.

* "Journal of Laryngology," October, 1893.

INCORPORATED SOCIETY OF MEDICAL OFFICERS OF HEALTH.

Meeting of Members, May 21st, 1894.

Newcastle Cholera Sterilizer.

Dr. Henry E. Armstrong exhibited a model of the sterilizers provided by the sanitary authority of Newcastle-upon-Tyne for the hospital which they erected last year in anticipation of an outbreak of cholera, and said the Society had some time ago brought before them by Dr. Sisley a description, with drawings, of the cholera excreta sterilizer at the Alexander Hospital, St. Petersburg. That apparatus, though excellent in principal and original in design, was too elaborate and too costly for general use. It consisted essentially of a lareg central receiver, to which the excreta were conveyed by pipes from the different wards for subsequent sterilization in a steam jacketed boiler. These pipes—which in a large hospital would be of very considerable length—together with their inlets, would be continually lined by a layer of infected excreta. There were also electric and other complicated appliances connected with the sterilizer which would be liable to get out of order.

These objections were obviated in the cholera sterilizer, of which the exhibit is a model. Five of the sterilizers had been made for the Newcastle Cholera Hospital erected last summer. They were manufactured by Messrs. Goddard, Massey, and Warner, Nottingham, on the design of Mr. Wm. Warner, of that firm, acting under the instruction of the City Engineer of Newcastle-upon-Tyne, Mr. W. George Laws, M.Inst.C.E, and the Medical Officer of Health. The apparatus, of which an illustration is given, consists of a 20-gallon cast-iron sterilizing vessel, having in its top side a circular opening nine inches in diameter, with a hinged and balanced lid capable of being closed and made steam-tight. Communicating with the interior of the vessel are four pipes, viz., (1) a steam supply pipe, terminating near the bottom of the vessel, for sterilizing; (2) a steam eject pipe, terminating in the upper part of the vessel; (3) a water pipe for washing out; and (4) a pipe four inches in diameter for the discharge under steam pressure of the contents of the vessel after disinfection.

The sterilizer is not jacketed. Its capacity is based on the estimated requirements of a ward of twenty beds. It is placed in an offshoot of the ward, corresponding to the chamber of a water closet. Into it are emptied the evacuations, floor washings, and slops of all kinds. The exhibitor had had the idea of having the circular opening sufficiently large to admit a bed pan, but this was thought by Mr. Laws to be likely to weaken the apparatus, and was not attempted. The inlet is arranged to serve as the seat of a closet for convalescents, and a wooden rim is provided for laying over it before such use.

The *modus operandi* is as follows: Whenever the sterilizer is sufficiently full to be ready for disinfection, which may be once or twice every hour, an attendant is summoned, and enters the closet by an external door. He then fixes down the lid by means of the screws, and turns on steam for disinfection. In about seven minutes the pressure rises to 30 lbs. After ten minutes more he opens the cock of the steam ejector, and closes that of the steam pipe for disinfecting. He next opens the discharge valve, and the contents of the sterilizer are ejected into the tank, there to cool before being sent into the sewer.

The cost of the sterilizers, apart from the steam appliances, is £30 each.

Disinfecting Hulk of the River Tyne Port Sanitary Authority.

The difficulty recently experienced in dealing with ships arriving from infected ports, and especially those infected with cholera, has created a need for more complete means of disinfection of vessels and their contents throughout than has hitherto been employed.

During the cholera prevalence of the past two autumns the River Tyne Port Sanitary Authority, whilst fully appreciating the importance of the thorough disinfection of infected ships and their contents, has realized the inefficiency of the ordinary means and appliances. The Holt system, named after its organizer and developer, and carried out by him at New Orleans, has probably been hitherto the best in the world. The disinfection by steam and perchloride of mercury, in that system, is excellent. But the wholesale burning of sulphur, which is the third part of the system, is attended with risk of fire, and is otherwise open to objection. Apart from the mere difficulty of finding an available site for a disinfecting station on the shore of a port, the propriety of having such a fixed station in most English ports is, to say the least, doubtful. In comparatively narrow river ports the danger to the floating and riparian populations of permitting an infected or suspected ship to pass upwards is sufficiently obvious. Besides, the free use of perchloride of mercury for disinfecting ballast and bilgewater in the upper reaches of such ports will poison the fish, a special objection in salmon streams like the Tyne.

The use of liquefied sulphurous acid instead of burning sulphur does away with danger from fire. The objections to a disinfecting station fixed on land are obviated by the provision of a floating one to go to the infected ships instead of having them brought to it. The excellence of this suggestion, for which we are indebted to Mr. W. George Laws, C.E., was at once recognised by the writer and recommended to the Port Sanitary Authority, who approved and adopted the proposal. Messrs. Goddard, Massey, and Warner were invited to prepare plans and estimates for a complete set of disinfecting apparatus in accordance with the report of the Medical Officer of Health, and the proposals of Mr. Laws, including (1) a steam disinfector for clothing, bedding, rags, etc.; (2) apparatus for effectually douching decks, floors, woodwork, sand ballast, certain cargoes, etc., with a 1-500 solution of perchloride of mercury; and (3) a plentiful store of liquefied sulphurous acid for fumigating berths, crew spaces, 'tween decks, or other infected places on shipboard. The plans were adopted, the machinery was ordered, a hulk was purchased to hold it, and on the request of the authority, Mr. Laws undertook the superintendence of the work, which is now nearly completed, and will be available in the event of a return of cholera this summer.

Mr. Warner's technical description of the apparatus is as follows: The hulk measures fifty-four and a-half feet extreme length, and eighteen and a-half feet extreme breadth. The available space for machinery and storage is twenty-nine and a-quarter feet long by eighteen feet wide, forming the hold. The deck is continuous along the sides about two feet wide and at the fore and aft about twelve feet by twelve feet. The disinfecting apparatus consists of two circular tanks for solution of perchloride of mercury, each five and a-half feet in diameter by four feet deep, together having a capacity of about 1,100 gallons. A steam disinfector three feet diameter by five feet six inches long, with the usual fittings to allow steam to pass into the materials under treatment, a steam pressure guage to register the temperature and pressure. The air compressor is of the vertical type, has steam cylinder four inches diameter by three-inch stroke, with air compressing cylinder five inches diameter by three-inch stroke. It is provided with fly-wheel and crank shaft to give even speed and regulate length of stroke. The air inlet and outlet valves are gun metal. The compressed air is conveyed to an air receiver two feet diameter by five feet high, made of steel boiler plates to form a reservoir of air at a pressure. The steam boiler is vertical type of four-horse power, six feet high by three feet diameter, having internal fire-box and two cross tubes. It is provided with steam pipes and connected with the air compressor on one side and the steam disinfector on the other. The boiler is capable of working at a pressure of 60 lbs. on the square inch, but a less pressure is found sufficient to work the air compressor and the disinfector. When working, steam is got up in the boiler and then passed by opening a valve into the pipes, so that clothing may be disinfected as desired by steam, but in order to use the perchloride of mercury spray the air compressor is started and allowed to compress air to about 10 lbs. pressure inside the air receiver. The compressed air supply pipes connect between the air receiver and two special spray nozzles, and they are also

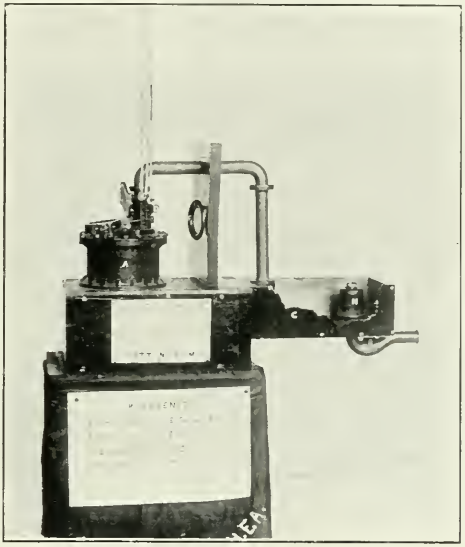


FIG. 1.—NEWCASTLE CHOLERA STERILIZER.

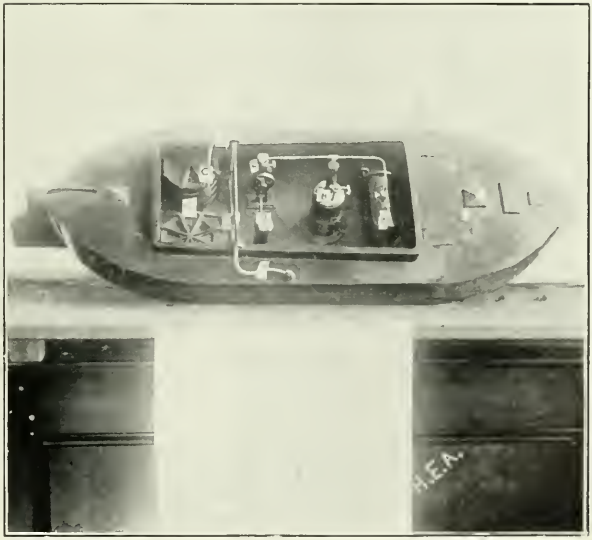


FIG. 2.—DISINFECTING HULK OF THE RIVER TYNE PORT SANITARY AUTHORITY.

connected to the bottom of the perchloride storage tanks. When the spray is used the compressed air passes down a double pipe conveying it along with the solution, and they meet together at the nozzle, where the force of air forms a spray at a pressure sufficient to carry several feet, and thus the decks and internal parts of an infected vessel may be easily covered with a fine spray of solution of perchloride of mercury. The estimated cost of the hulk and machinery complete is £745.

The accompanying illustration is from a photograph of the model.

SEWER AIR INVESTIGATIONS.

Mr. J. Parry Laws, F.I.C., has made, on behalf of the London County Council, two series of experimental observations on the condition of sewer air in London. The positive results of the first series of experiments are summarised by him as follows :—

I. The micro-organisms in the sewer air are related to the micro-organisms in the air outside, and not to the micro-organisms of the sewage.

II. In the air both within and without the sewer the forms of micro-organisms present are almost exclusively moulds and micrococci; on the contrary, the micro-organisms of sewage are for the most part bacilli. Of the latter sometimes as many as 25 per cent. very rapidly liquefy the gelatine on which they grow, whereas in the whole course of my experiments with fresh air and sewer air I only met with one colony, and that a micrococcus rapidly liquefying gelatine.

III. That for purposes of deodorising, manganate of soda and sulphuric acid and carbolic acid are the most efficient of the several chemicals tried, and setting aside the question of relative cost, the former is decidedly preferable for the reason stated above.

The whole of my results point unmistakably to the conclusion that the principal, if not the only, source of micro-organisms in sewer air is the air without the sewer and not the sewage, and they also tend to prove that there is very little ground for supposing that the micro-organisms of sewage, in the absence of violent splashing, become disseminated in the sewer air.

Mr. Laws adds: In carrying out this work I have made a very large number of cultivations of the various organisms met with, in order to study them with the microscope both in stained and unstained specimens. It is in this particular direction that my experiments are so much more complete than those of Drs. Carnelly and Haldane.

In conclusion let me emphasise the fact that these observations only hold good for sewers in which the conditions are the same as those under which I experimented. What the condition of the air would be in sewers in which there is only an intermittent flow of sewage, or in which the sewage becomes stagnant and highly putrefactive, further experiment alone can show.

The second report deals with experiments directed to ascertain the following points :—

1. Whether an increase in the velocity of the air current in a sewer beyond the limits met with under ordinary conditions would produce a concomitant increase in the number of micro-organisms.

2. Whether the conclusions arrived at from the experiments in large sewers hold good for small sewers when the flow of sewage is intermittent, and the velocity of the air-current variable.

3. What influence, if any, stagnant and highly putrescent sewage has upon the number of micro-organisms in sewer air.

4. Whether the various micro-organisms collected from sewer air during the progress of all my experiments were identical with the micro-organisms isolated from fresh air in the same vicinity and at the same time.

The result conclusively showed that a considerable increase in the velocity in the air-current does not produce an increase in the number of micro-organisms found in the sewer air.

On the second point "in most cases, under the conditions named above, the number of micro-organisms found in the air surrounding the sewer exceeds those found in the air within; in the only case in which the number of micro-organisms found within the sewer exceeds in a marked degree the organisms found without, the increase is entirely due to moulds, and not to bacteria. It is really remarkable to find that no organisms are given off from the walls of a sewer which has been empty and open to the air at both ends for such a lengthened period as twelve days The sewage with which the sewer had been kept full for several periods of twenty-four hours would contain no less than three to four million organisms per cubic centimetre, and immense numbers of these must of necessity have been clinging to the walls of the sewer. From this it is evident that the conclusions arrived at from my previous experiments in the King's Scholars' Pond sewer hold good for smaller sewers."

On the third point, the increase of micro organisms was found to be in moulds and not in bacteria.

Mr. Laws summarises his general conclusions in the following words :—

"The organisms of fresh air and sewer air were found to consist chiefly of moulds and micrococci, whereas the organisms of sewage, so far as my limited observations go, consist essentially of moulds and bacilli. I have found the ratio of

micrococci to bacilli in fresh air and sewer air to be about five of the former to one of the latter, a ratio which would in all probability be reversed in the case of sewage. There are two points with reference to the organisms in sewer air to which I wish to call special attention—firstly, the absence of bacillus coli communis and micrococcus ureæ, two organisms which must be present in sewage in immense numbers; secondly, the almost entire absence of any organisms capable of very rapidly liquefying gelatine, the only exceptions being the common hay bacillus (bacillus subtilis) and a micrococcus mentioned in my first report. In sewage, on the other hand, a large number of organisms, for the most part bacilli, possess this property of very rapidly liquefying gelatine. All the micro-organisms isolated belong to that class known as non-pathogenic or harmless bacteria, and with one exception are common in air and water.

"Two organisms, a bacillus and a micrococcus, concerning which there was some slight suspicion as to their non-pathogenic properties, I submitted to Dr. F. Andrewes. From his report it is seen that the bacillus was one of the many lactic acid ferments, and that the micrococcus which occurred only once during the course of these investigations was the staphylococcus cereus flavus of Passet, a rather rare organism occurring in pus, but quite devoid of any pathogenic property.

"The results of these further investigations strengthen very considerably the conclusion arrived at from my previous experiments, viz, that the micro-organisms in the sewer air are related to the micro-organisms in the air outside, and not to the micro organisms of the sewage.

"As our knowledge of the various organisms occurring in sewage under varying conditions is so limited, it is in my opinion most desirable they should be submitted to careful examination. A knowledge of the various species would in all probability considerably strengthen the conclusion that the micro-organisms in sewer air are derived solely from the fresh air gaining access to the sewer by ventilation.

"Although one is led almost irresistibly to the conclusion that the organisms found in sewer air probably do not constitute any source of danger, it is impossible to ignore the evidence, though it be only circumstantial, that sewer air in some instances has had some causal relation to zymotic disease. It is quite conceivable, though at present no evidence is forthcoming, that the danger of sewer air causing disease is an indirect one; it may contain some highly poisonous chemical substance, possibly of an alkaloidal nature, which though present in but minute quantities may, nevertheless, produce in conjunction with the large excess of carbonic acid a profound effect upon the general vitality."

AIR-BORNE SMALL-POX INFECTION IN CONNECTION WITH THE LEICESTER EPIDEMIC.*

By J. Priestley, B.A., M.D. Lond., M.O.H. for Leicester.

About the middle of June, 1893, the cases of small-pox notified as occurring in Newfoundpool district became numerous, and it has been impossible to explain many of them, except by assuming that they became infected from the hospital. In Leicester the (comparatively) greatest number of cases is to be met with at Newfoundpool—a community consisting of (about) 3,000 people living in 600 houses. The position of the houses in regard to the hospital is south and south-west, whilst the distance of the nearest house from the hospital is 620 feet, and that of the farthest 1,750 feet. In this way a circle of 2,000 feet radius, with the hospital as a centre, would take in all the houses.

Out of a total of 347 cases of small-pox, 55 have occurred at Newfoundpool, giving a case-incidence there of 18·3 per 1,000 of the population as compared with 1·6 per 1,000 for the rest of the borough, *i.e.*, the Newfoundpool people have suffered 11 times as much as the rest of the town. It is only fair, however, to examine these 55 cases more minutely to find out, *e.g.*, how many have arisen from previous cases, and how many there are for which we fail to discover any more definite source than that of probable infection from the hospital. As the result of my examination, I find that out of the 55 cases 20 may be attributed to previous ones—*i.e.*, may be regarded as quarantine cases. Deducting these 20 cases, we still have 35 cases (representing 34 infected houses) whose sources of contagium are difficult to explain, save on this theory of hospital infection. Treating now the rest of the cases in the town in the same way, *i.e.*, deducting all those that have arisen from previous cases (as traced out by me), and comparing them with the Newfoundpool ones, we find that the ratio is as 1 to 15. So, too, by working out the number of houses infected in Newfoundpool and in the rest of the borough, we find the ratio as 1 to 15.

Thus, however we examine the subject, whether from the point of view of all cases, corrected cases, or infected houses, we find that Newfoundpool district has suffered 11 to 15 times as severely as the rest of the town; and, in my opinion, this state of things has been brought about by the close proximity of the small-pox hospital.

The hospital practically caused its greatest infection in the month of June, during which the weekly average of small-pox cases in the hospital was 49, a larger average than in any month during the year, except February, when the weekly average was 54.

Why did the small-pox not spread into New-

* From Dr. Priestley's Annual Report, 1893.

foundpool during February? is a question which naturally suggests itself.

There are various ways in which a small-pox hospital may act as a centre of infection.

1. It is acknowledged that infection may spread directly from person to person, so that it is readily understood how contact between patients, officials, visitors, etc., in the hospital and persons outside may spread the disease. Personally I have been unable, however, to trace such contact, and the stringent rules that have been enforced during our epidemic have, moreover, practically rendered such a means impossible. Even assuming such contact to have taken place, it is strange that it should have happened in June and not in February!

2. Air-borne infection does seem to play a part in small-pox epidemics, if we may judge from various reports, not only those specially published by the Local Government Board, but also those that have lately appeared in connection with recent small-pox outbreaks in various large towns. This air-borne infection may be (*a*) above ground, *i.e.*, through the atmosphere; or (*b*) under ground, *i.e.*, through the drains; and in either case it is reasonable to suppose that, taking a hospital as a centre, the cases would crop up more thickly the nearer the houses were to that hospital. Such is the case with the infected houses in Newfoundpool.

In considering this air-borne infection, there are many matters deserving our attention. Foremost are the accompanying meteorological conditions, *e.g.*, rainfall, temperature, direction of winds, etc.; and, in considering these conditions, I have been struck with the great difference as between February and June. In February the rainfall was 2·12 inches; the mean temperature low, varying from 45° to 31° F.; whilst the direction of the winds was principally west and south, *i.e.*, away from Newfoundpool; and the state of the weather was blue sky on 9 occasions, and cloudy or overcast on 14. Whereas in June the rainfall was ·64 inches; the mean temperature high, varying from 70° to 45° F.; whilst the direction of the winds was principally north and east, *i.e*, right over Newfoundpool from the hospital; and the state of the weather was blue sky on 19 occasions, and cloudy or overcast on 10. Meteorological conditions, therefore, would certainly favour the spread of germs from the hospital towards Newfoundpool during June, but not during February. The barometric pressure was low in February, high in June.

3. Another way by which germs might be carried is by flies, rats, etc., and though at first blush this may seem a far-fetched theory, when examined more carefully it is not so. Some recent experiments, made by Sawtschenko, show that cholera bacilli can live in the alimentary tract of a fly, and be found alive in the excreta. He fed flies on the intestinal contents of cholera cases, and found the characteristic bacilli in their alimentary canals and excretions afterwards.* Considering the numbers of flies and rats we have had at the hospital (the flies we might speak of as a plague, in such quantities were they), it is easily understood how they might carry infection about—more especially during the warmth of June than during the cold of February.

Everything, therefore, seems to favour the theory that our small-pox hospital has during part, at least, of our epidemic been a centre of infection; but the exact mode in which that infection has spread it is somewhat difficult, definitely, to decide, though personally, I am satisfied that the air has played an important part. Germs might also pass through the drains and be drawn by the ascensional force of evaporation through sewer gas into the houses.

The Sanitary Committee, fully alive to the danger of a small-pox hospital being near to other buildings, have endeavoured during the year to find a suitable site away from the town, but as yet unsuccessfully; and so they have, as the least of two evils, removed the wards (kept for the isolation and treatment of small-pox) as far away from the fever wards as possible on the present site, and have now means by which the two diseases can be more readily kept rigorously separated (administration, etc.) In this way the danger of small-pox spreading to the scarlet fever wards is minimised, as the distance for the germs to travel is now 600 to 700 feet, instead of 60 feet, as hitherto. The committee have done the best under the circumstances, but the present arrangement is only a temporary one; and the two wards built at the far end of our present hospital site are a temporary small-pox hospital, which can, and it is hoped will, be moved to another site away from the town in the very near future. There will, I fear, always be the danger of being satisfied with what has already been done, and that, therefore, the looking out for a separate site far away from the town may be neglected. As your medical officer of health, I trust not; but, on the contrary, venture to hope that the committee will secure a suitable site far away from the town and inhabitants for the separate treatment of small-pox cases, seeing that another epidemic may at any time overtake us. For it must be remembered that if there is one conclusion that can be drawn from our recent epidemic, it is that, our small-pox hospital having proved apparently a danger to the inhabitants of Newfoundpool, from its proximity (620 to 1,750 feet)—and I am satisfied that it has—there must also be a similar danger arising from our two new small-pox wards, which are only 700 feet from our scarlet fever wards. Even granting that aërial infection is not proved, it must be admitted that it has not, as yet,

* Other observers—Grassi, Cattani, Sizzoni, and Simmonds—have shown that flies can carry on their surface bacteria, so why not the bacteria or germs of small-pox? Vide PUBLIC HEALTH, May, 1893, and *Hygienisches Rundschau*, April, 1893.

been disproved; and, therefore, you as a health authority ought to act on the side of extreme caution, and move our two hospitals as far away as possible from one another, and our small-pox hospital as far away as possible from the town and inhabitants.

LAW REPORT.

Sale of Milk - Written Warranty—Necessity for Proof by Defendant that Milk was Sold in same State as that in which it was Purchased—Sale of Food and Drugs Act 1875, *section* 25.

JONES v. BERTRAM.

THIS was an appeal by way of special case from a decision of a metropolitan police magistrate dismissing a summons charging the defendant with having sold milk not of the nature, substance, and quality demanded by the purchaser, contrary to the provisions of the above Act.

The facts stated were that on October 12th last the respondent received certain churns of milk from his contractor with a warranty. Some of the milk was served out at the defendant's various bars, and in the evening the complainant purchased at one of the bars a sample of milk for the purpose of analysis. This sample on being analysed was found to contain 36 per cent. of added water.

At the hearing of the charge the magistrate dismissed the summons on the ground that the defendant had purchased the article in question as the same in nature, substance, and quality as that demanded of him by the complainant, and with a written warranty to that effect, and that he had no reason to believe at the time when he sold it that the article was otherwise.

At the hearing of the special case the point was taken by the appellant that the magistrate had not found as a fact that the respondent sold the milk in the same state as when he purchased it.

The Court (Justices Mathew and Collins) held that there was strong evidence that the article when delivered to the respondent corresponded with the warranty, and the Act imposed upon the seller the obligation of showing that when he sold the article it was in the same state as when he purchased it, and that the magistrate ought to have convicted. The Court, therefore, allowed the appeal, and sent the case back to the magistrate to inflict such penalty as he thought fit.

PARTY POLITICS AND SANITATION. — From the *Liverpool Mercury* we learn that a proposal of the medical officer of health that 571 houses in various parts of Liverpool should be demolished was postponed, on the plea that provision should be first made for the displaced tenants. "The division was of a party character, the majority in favour of delay consisting of 20 Liberals, and the minority of seven Conservatives and a Liberal Unionist."

ON THE LIMITS OF AERIAL CONVECTION OF SMALL-POX.*

By Dr. C. E. MATTHEWS, Medical Superintendent of the Gore Farm Hospital.

THE Gore Farm Hospital was closed for fever on March 6th, 1893. In consequence, however, of the pressure upon the accommodation of the London hospitals, it was decided to re-open the Lower Hospital for fever, and this was done on June 29th. From this time up to the end of the year the hospital was used simultaneously for the reception of convalescent small-pox and fever patients. At the beginning of this period, *i.e.*, June 29th, the Upper Hospital contained upwards of 200 small-pox cases, and at the end, *i.e.*, December 31st, 19 cases. The Lower Hospital provided accommodation for 200 fever cases, and was kept filled almost to the end of the year.

By your direction an entirely separate staff and hospital administration was organised for each disease, and it is satisfactory to record that no single instance occurred of infection being transferred from one hospital to the other.

In order to minimise the risk of fever patients catching small-pox, special precautions were taken by the medical superintendents of the London hospitals to transfer only patients who showed evidence of previous vaccination. These measures, and the careful observance of regulations issued to the staff, are, to a great extent, responsible for the successful result which attended the simultaneous admission of these two diseases at Gore Farm.

This experience offers an interesting contribution to the controversy as to the aerial convection of small-pox.

The distance between the two hospitals is about 1,000 feet, and on the opposite side of the small-pox hospital, at about the same distance from it as the fever hospital, are situate the Darenth Asylum and Schools. None of the inmates of these institutions to my knowledge contracted small-pox during the period treated of. A belt of trees surrounds the small-pox hospital on nearly every side, but it cannot be contended that this offers an effectual bar to the passage of small-pox germs.

There seems to me sufficient evidence from this experience for assuming that the diffusion of small-pox through the air does not extend to a distance of 1,000 feet, and that, provided personal conveyance of infection can be excluded, a small-pox hospital may exist at this distance with impunity to the surrounding population. [Does not the fact that the scarlet fever patients at Gore Farm, and probably also the inmates of the Darenth Asylum and School, were well vaccinated, constitute a fallacy in these interesting observations?—EDITOR P. H.]

* From the annual report for 1893 of the Metropolitan Asylums Board.

THE WATER SUPPLY OF STOCKPORT.

A VERY able and exhaustive report on the water supply of Stockport has recently been presented to the Corporation of that borough by Dr. Charles Porter, their medical officer of health. The report bears every mark of deliberate and careful preparation, raises questions of more than merely local importance, and is characterised throughout by an evident desire to hold the scales impartially between the Corporation and the private company in whose hands the water-rights of the borough at present remain.

From the historical summary with which the report opens it appears that in 1825 a private Act was obtained authorizing the raising and distribution from the Mersey of water for the supply of the town, which had hitherto been derived from springs and wells. Pollution by trade effluents, however, made the discontinuance of the river supply imperative in 1859, and since that time the water service has been drawn from (1) an upland surface gathering ground (1,700 acres) at Disley, Cheshire, (2) from the Manchester Waterworks, to the extent of 1,000,000 gallons per day, by agreement, and (3) from deep wells in the Red Sandstone.

In 1867 the Corporation obtained powers to purchase the existing waterworks, and it is strange that this power has never been exercised. In section II. a detailed description, elucidated by map and diagrammatic sketches, is given of the streams, reservoirs, and dwellings on the gathering ground, with special reference to conditions of refuse disposal, which were in some instances very unsatisfactory. The yield of the catchment area was next dealt with, and in this connection Dr. Porter has, with unsparing pains, collated from a variety of reliable sources much interesting and valuable information with reference to the loss of available rainfall by evaporation, absorption, and unavoidable waste.

By the application of the rule laid down by eminent hydraulicians, that storage capacity for from 120 to 150 days should be provided in rainy districts, it is shown that the capacity of the existing reservoirs is very considerably below that necessary to secure the full water-yielding potentiality of the gathering ground. In the following section the most recent views of Dr. Koch and other experts on the subject of sand-filtration are put forward, and the company's statements as to their methods are considered.

With reference to their rate of filtration they allege, we notice, that there exists so large an excess of filtering area over water requiring to be dealt with that filtration is always very slow, and that the question of undue rapidity does not arise. Dr. Porter, however, directly traverses this statement on the ground that a special test, undertaken at his request, indicated a rate of five and one-sixth gallons per square foot per hour, or more than two and a-half times the rate recommended by Professor Koch. He further proves, from the company's official figures, that, tested by Koch's rules and under the constantly occurring condition of one filter being out of use, the excess of filtering area asserted by the company to exist is represented by a *minus* quantity. With regard to bacteriological examination of the effluents, the medical officer appears to have failed to obtain any direct reply from the water company, while his request to be permitted to sample the effluent of each filter was apparently evaded on the first occasion, and refused, in compliance with "special instructions," on a subsequent one. We shall be surprised if such autocratic behaviour is found to be conducive to the interests of any water company, however powerful. Such occurrences certainly emphasise the desirability of having at once made applicable to the kingdom generally the recommendation of the recent Royal Commission on the Water Supply of the Metropolis —that a duly appointed water examiner should at all times have the legal right of entry to, and inspection of, all waterworks. With reference to the quality of the water service, it is satisfactory to find that the water of each of the three sources of supply is regarded as good, and although in the analyst's table some very inferior waters appear, these are found to have been taken from streams at Disley, near to sources of pollution which have since been removed. Attention is, however, directed to a suggested deterioration of the Disley water between the filters and the consumers' taps as a subject for further inquiry. The quantity required and available is next discussed, and the opinion expressed that the present sources are unduly liable to become insufficient for existing requirements.

Other important matters dealt with include the insufficiency of the company's one-and-a-half-gallon allowance for flushing water-closets; the prevention of leakage from, and of pollution by lateral insuction through defects in, mains etc.; the probable future requirements of the borough, and the water-yielding capabilities of the Triassic and Permian rocks of the district.

The report terminates with a number of well-considered and carefully-worded conclusions and recommendations, special prominence being given to the desirability of acquiring the right of entry at all times to all parts of the waterworks.

We congratulate Dr. Porter on the completion of an excellent and laborious piece of work, which speaks loudly to the credit of his industry and patience, and we commend his report to the careful consideration of his Authority and of all who are interested in the important question of public water supplies.

REVIEWS.

Micro-Organisms in Water.*

Our hearty thanks are due to Professor and Mrs. Percy Frankland for this important contribution to the bacteriology of water. The work is specially designed for the use of those connected with the sanitary aspects of water supply; and we venture to think that it will be simply invaluable for all such. If it only focussed (as it does) all the knowledge on the subject which has been hitherto scattered in various periodicals and reviews, the book would have more than justified its appearance. It does, however, much more than this, as it embodies much original work on the bacteriology of water, which Professor Percy Frankland and his talented wife have made specially their own.

The first chapter gives ample details on the technique of water bio-analysis, while the second describes the methods of staining and microscopically examining micro-organisms. In the third chapter we are introduced to the practical details of examination of water for micro-organisms, including the photographic record of plate-cultures.

In the fifth chapter is an elaborate examination of the bacterial contents of various waters. The authors give some results from the river Dee not previously published. It appears that above Braemar the Dee is bacteriologically of great purity, yielding only 88 micro-organisms in 1 c.c. After receiving the sewage of Braemar the number has increased to 2,829 in 1 c.c. In the flow from Old Mar Castle to a point above the Bridge of Ballater the number has diminished to 1,139 in the c.c. A sample taken one hundred yards below the Ballater sewage-pond outfall shows as many as 3,780 in the c.c. A sample taken lower down, above the junction of the Neil Burn, showed that the micro-organisms had again fallen to the same number as above Ballater; and so on for about forty miles which were covered by the examination.

The Dee in fact affords an excellent example of the repeated pollution and restoration to a comparative state of purity, which may occur during the flow of a river. It shows also the value of the bacterioscopic examination of water, as the amount of polluting material gaining access at various points was too small to be detected by chemical analysis.

The fifth chapter is, perhaps, the most important in the book from a sanitary aspect. It embodies a description of the bacteriological work of the last ten years, which has placed the subject of water-purification on an entirely new basis. The results obtained *inter alia* by the authors show that in the matter of sand filtration we now know the factors on which success depends, and can regulate the efficiency of the filtration. It is shown how uniform from a bacteriological point of view is the filtered water produced by the several companies supplying the metropolis, the number of micro-organisms only varying from 13 in the c.c. for the New River to 35 for the Southwark Company.

The results obtained by Prof. P. Frankland, and more recently at Berlin, conclusively establish that the rate of filtration is the most important factor; the filtrate being deteriorated, and the filter becoming rapidly clogged when the filtration is too rapid. Pielke, in a small experimental filter with sterilised waterworks sand, found that the power of retaining microbes was *nil*; and it is now certain that it is the slime deposit on the sand which constitutes the real filtering material in filtering beds.

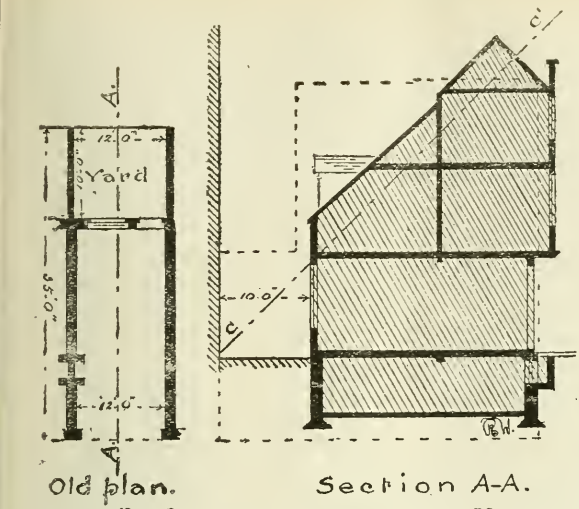
The effects of storage on the microbe purity of water are described. By its means alone, the authors experimentally were able to bring the waters of the Thames at Hampton, and the purer water of the New River Company's channel to the same bacteriological level.

The sixth chapter deals with the interesting question of the multiplication of micro-organisms in water. The authors give experimental results showing that this is much more rapid when the air has free access. The enormous multiplication occurring for the first ten or twelve days is followed by a reduction in the number of micro-organisms.

The detection of pathogenic bacteria in water is dealt with in the next chapter. In the village tanks used for drinking purposes near Calcutta, Koch found comma bacilli on February 8th, and these were still found to have maintained their vitality at the end of fourteen days. The difficulties of distinguishing the B. coli communis in water from the typhoid bacillus are increased by the superior vitality of the former. The methods of diagnosis devised by Uffelmann, Holz, Parietti, Vincent, Chautenosse, Widal, and Thoinot are described. It is unfortunate that so much of the work done in investigating the deportment of the typhoid bacilli in unsterilised water is quite untrustworthy. It is fortunate for humanity that in unsterile water both typhoid and comma bacilli tend to quickly perish, while the normal water bacteria rapidly multiply. It must be remembered, however, that the comma bacillus has been found capable of living for long periods in brackish water, such as the harbour water at Marseilles. During the cholera epidemic in 1892 at Hamburg the water was distinctly brackish.

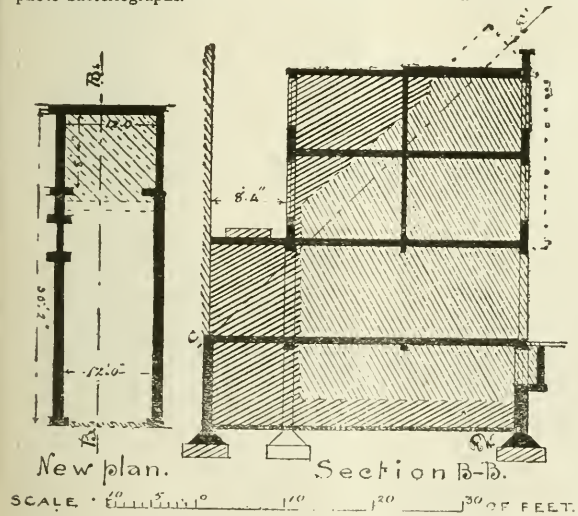
The contents of chapter IX will be familiar in outline to those who read Professor P. Frankland's recent article in the *19th Century* on the effect of light on micro organisms. Perhaps the most important point practically is the sterilisation of agar-

* "Micro-Organisms in Water: Their Significance, Identification, and Removal. By Percy Frankland, F.R.S., and Mrs. Percy Frankland. (Longmans, Green, and Co. 1894. Nett, 16s.).



Old building, with yard and sloping roof at back for air play, almost anticipating the L.C.C. proposals.

agar cultures of the typhoid bacillus by exposure to one hour of bright sunshine, the results being very strikingly shown in Buchner's experiments by photo-bacteriographs.



New building on same site; area wholly gone; air space completely blocked out; two lower floors made back to back, all according to existing Acts.

the County Council for not adhering to their more stringent original demands.

Mr. Williams appears to us to take too mechanical a view of the connection existing between density of population and the general death-rate. It is well known that after making allowance for a selected population, the death-rate in certain block dwellings compares very favourably with that of less closely aggregated districts. The main contention, however, that it is desirable to spread out our urban populations as widely as possible is undoubtedly sound. Mr. Williams' diagrams illustrating the evils associated with deficient air space are very striking, as will be seen from the appended example.

All who are interested in the welfare of the densely aggregated populations of our towns will do well to purchase and closely study the illustrations given in these two pamphlets.

We have said enough to indicate that this book presents very high intrinsic merits. These are increased by an appendix containing a complete list of water micro-organisms, their method of growth, etc. The book will be indispensable to those engaged in the sanitary examination of drinking water, and to the general hygienist it is most valuable as focussing the widely scattered knowledge on this important subject.

A Plea for More Breathing Room.*

In two vigorous pamphlets Mr. Williams has furnished a valuable contribution to the important question of overcrowding of population in space. The first of these pamphlets deals with the objections to the London County Council's London Streets and Buildings Bill, and chides

* "More Light and Air for Londoners." By Robert Williams, A.R.I.B.A. (Wm. Reeves, 185, Fleet Street. Price 1s.) "London Rookeries and Colliers' Slums." By the same Author. (Wm. Reeves. 1s.)

The Aged Poor in England and Wales.*

Mr. Charles Booth has brought together in this volume in an accessible form a large amount of tabulated information, which will be invaluable when the question of old age pensions comes to be practically legislated upon. Mr. Booth has succeeded in focussing into one picture the results of an examination of the very diverse methods of poor-law administration in the 648 Poor Law Unions of England and Wales.

The volume before us consists of four parts, with copious appendices. Parts I., II., and III. deal with the general question, and Part IV. more exclusively with old age in our villages. The amount of destitution in different districts has very little apparent connection with the average wage-earnings of a district, probably owing to higher rentals and more drinking where wages are high. It is somewhat more surprising to find that the relative amount of outdoor relief exercises but little influence on the extent or cost of pauperism.

Mr. Booth's general conclusions are summarised in a final chapter. From these we learn that while only 5 per cent. of the population are paupers taking all ages together, the rate is about 10 per cent. between 60 and 65, 20 per cent. between 65 and 70, 30 per cent. between 70 and 75, and not much less than 40 per cent. over 75. Inasmuch as probably one-third of the total population contributes little or nothing to the list of paupers, it would probably be found that among the working classes and small traders the rate of pauperism for all over 65 is not less than 40 to 45 per cent.

The proportion of the old relieved is greatest in the Eastern counties, smallest in the North; greatest where population is decreasing, smallest where it is increasing; and greatest in towns where population is most dense. As regards methods of relief no policy stands out as on the average definitely superior to the others as regards the old. There are no statistics to show whether pauperism in old age has increased or decreased, but the figures for total pauperism show general improvement from 1881 to 1891, everywhere except in London. The improvement shown in the decade is greatest in Wales, which on the whole represents an outdoor policy, and in the West, which on the whole represents an indoor policy. The maximum amount of general pauperism in one group of districts is no less than ten times the minimum, and in no large group is the proportion less than three times. The explanation of the differences is in Mr. Booth's opinion not to be found in lax administration, but is still to be sought.

In towns poverty is most acute; in country places it is most successfully relieved. The former is ascribed to various causes, as the fact that strength fails sooner in towns, and that there is in towns less work suitable for old men; while the latter is owing to the cheaper house-room, more garden work, stronger neighbourly relations, and charitable assistance given with more knowledge.

Comparing the present with the past, Mr. Booth summarises hopefully though only partially so.

(1) The old share in the generally improved condition of the people due to higher wages and lower prices.

(2) They are, however, comparatively at a disadvantage owing to the increased stress of industrial life.

(3) The improvement in industrial condition thus acts directly against, and only indirectly in favour of the old.

* "The Aged Poor in England and Wales." By Charles Booth. (Macmillan and Co. 1894. 8s. 6d. nett.)

The Evolutionary Development of Infectious Diseases.*

While clinical experience seems best to fit in with the view that the different infectious diseases "breed true," it is no new idea to assume that there are in accordance with the evolutionary hypothesis intermediate forms of disease which do not conform to any single type. This idea is worked out in some detail by Dr. Craig in his interesting—but occasionally obscurely written—pamphlet.

He makes a strong point of the fact that in an uncomplicated case of influenza the symptoms have a great resemblance to those of the prodromal stage of any fever, and are very similar to those characterizing hay fever. In typhoid fever there is a similar prodromal stage, when it is often called gastric fever. In working out an analogy between diphtheria and typhoid fever he says "the tonsils are, so to speak, the blotting paper of the mouth, and the Peyerian glands and solitary glands the blotting paper to the gut; and the fevers of typhoid and diphtheria are very closely allied, only the one is a disease of the throat and the other of the gut."

In scarlet fever we have a condition allied to diphtheria, but "there is the further manifestation of a general and characteristic rash. The rash is the spores (*sic*) getting into the blood, and being carried by the general blood-stream to the skin and irritating it, creating a papular inflammation of the papillæ, which by and bye desquamate, and hence the infectious nature of the peeling skin." Measles is "another variation and subtle distinction." Typhus fever is "a stomach form of typhoid, and a filth influenza."

So far as we can understand Dr. Craig's views they imply the existence of "a spore" on the

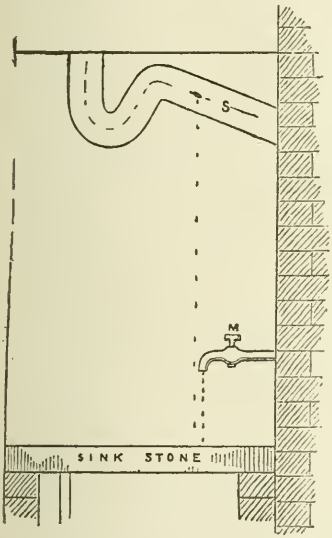
* "The Evolutionary Development of Infectious Diseases." By Wm. Craig, M.B., C.M., M.O.H. for Cowdenbeath. (Young J. Pentland.)

varied development of which the different infective diseases depend. He adds, "I believe the prodromal stage of any infectious disease to be an attack of the spore, and cholera has no such stage. In cholera the poison undergoes its cultivation to the bacillus outside the body, hence there is no period of incubation or prodromal stage, but at once the rapid onset of the disease."

By means of phenacetin Dr. Craig believes that he has been able to induce a premature crisis and abortion of infectious diseases.

House Sanitation.*

Dr. Vacher's valuable book is so well known that its second edition requires only a formal introduction. It may be described as a sanitary chamber of horrors. Sanitary defects common



and uncommon are pictorially represented in such a way that he who runs may read. By this means a vast amount of information is conveyed in an agreeable form. The accompanying illustration may be taken as an example of the figures in the book.

The author considers it one of the most interesting in the series. He says, "I received notice of a case of typhoid fever in a very old house in a poor neighbourhood. The patient was forthwith removed to the fever hospital, and the usual report as to the state of the premises was submitted to me. From the latter I gathered that the house was dirty, and that there was a water-closet built out from the back wall, a separate service cistern for the same, and a pipe from the main for drinking and domestic purposes. Not satisfied with this report, I examined the premises myself. I found the closet was entered from a small landing on the stairs, between the ground floor and the first floor. On looking to see what was under this (on the ground-floor, I was surprised to find a sink-stone and a tap from the main. Immediately over the sink-stone was the lead trap from the closet, and a transverse portion of soil-pipe connected therewith, which was carried through the back wall into the house. In the soil-pipe close to the trap was a corroded hole, the position of this being shown in the cut. Through this hole foul gases must often have been discharged, the foul liquids from the closet must often have overflowed. Indeed, here were all the conditions present which one would expect to find resulting in an outbreak of typhoid fever. What in all probability happened is that drinking water drawn from the tap was polluted with excremental liquid dropping into it, and that water thus polluted was actually drunk. The illustration indicates how easily a jug of water drawn from the main tap (M) might be polluted by foul liquid running from the hole in the soil-pipe (S).

* "Defects in Plumbing and Drainage Work." Described by Francis Vacher, M.D. Upwards of 100 illustrations, Second edition. Demy 8vo. Cloth, 1s. (Heywood. Manchester.)

The Ventilation and Warming of Houses, Churches, Schools, etc.

Dr. Jacob has produced an admirable manual on this subject, closely packed with valuable facts and illustrations. For a shilling a vast mass of information can be obtained of high value to sanitarians, clergymen, and school teachers and managers.

A pathetic interest is given to this book by the fact that while it was going through the press its talented author died at a comparatively early age. The series to which this book belongs is not sufficiently well known. They are all cram full of valuable information. It is sad to think that one more is added to the number of deceased authors (Edmund Parkes, De Chaumont, and Bernays) connected with the series.

In laying down the general conditions under which public buildings may be well ventilated, Dr. Jacob emphasises the neglected rule that good ventilation must be expensive. The necessity of making ventilating arrangements in building a church is emphasised: "It is easy to make a building healthy if it is caught young." As to methods of warming, the following summary is given: "When a room is filled with people, heat is only required for ventilation purposes (indirect radiation). When empty 'direct radiation,' or an uncased radiator, is best. When partially filled a radiator partly open and partly ventilating."

Gas is condemned as a source of light, as ordi-

* "Notes on the Ventilation and Warming of Houses, Churches, Schools, and Other Buildings." By the late Ernest H. Jacob, M.A., M.D.Oxon. (Society for Promoting Christian Knowledge. 1894. Published price, 1s.)

narily used. "The true function of gas is to serve for cooking purposes, for which it is quite unequalled by any other form of fuel."

The next chapters deal with schemes of ventilation for schools, churches, and hospitals. These are clearly described and illustrated by plans and sections. Then follows a most interesting chapter on examples of methods by which bad ventilation may be improved. The book is thoroughly practical, and in the interest of the health of the community we hope it will be widely studied.

NOTES ON BOOKS.

Teratologia: Quarterly Contributions to Antenatal Pathology. By J. W. BALLANTYNE, M.D., F.R.S.E. (Williams and Norgate, 14, Henrietta Street, W.C. 2s. 6d.)—The first number of this quarterly journal promises well for its future success. The chief article is on the fœtus amorphus, and is illustrated by three plates. There is also an interesting history of fœtal pathology in the past, and abstracts from current literature, reviews, etc.

Rural Hygiene. By FLORENCE NIGHTINGALE. (Spottiswoode and Co. 1894. Price 6d.)—This is a reprint of a paper read at the Conference of Women Workers held at Leeds in November, 1893. Everything that Florence Nightingale writes commands respectful attention. Her writings are pithy and full of striking remarks, and a large vein of common sense pervades the whole. The secret of the whole scheme is that it is women's mission to go round the village showing the people on the spot where to put their refuse, how to keep their water supply pure, etc.

A Manual of Practical Hygiene.—By Drs. COPLIN and BEVAN. (Kegan Paul, Trench, and Co.) — This voluminous work is written by two American physicians, both of whom have had experience in the teaching of hygiene. It is embellished by 140 illustrations, many of which are printed in colours. The different branches of the subject are worked out on a uniform basis, as bearing on the causes of disease, their methods of ingress, and the available means for their prevention. Perhaps the part of the book which will have the greatest interest for English hygienists is that in which American systems of heating and draining houses are fully described. On page 115 the Berinling Patent Milk Test, on the principle of a centrifugal acting machine, is fully given. Vogel's hœmoglobin test for carbon monoxide is given on page 226. The authors connect damp soil with the specific origin of tuberculosis by the assumption that in moist soil we have all the elements necessary for the propagation of this organism. The work will well repay perusal. It has many novel features, and is less of a stereotyped text-book than the majority of systematic works.

REPORT OF MEDICAL OFFICER OF HEALTH.

NORWICH.

DR. COOPER PATTIN prefixes the following motto to his annual report :—

"I cannot tell what you and other men think of this life; but for my single self—I'd as lief not be, as live to be in awe of such a thing as I myself."

and he states in his preface that, "In the following pages you will probably find material for reflections of a disquieting character—for I hold it to be no part of my duty to prophesy smooth things because the people love to have it so. But to reach this, in my judgment, distinctly attainable station (*i.e.* making Norwich one of the healthiest towns in the kingdom) will necessitate for us all, and for some years, patience, persistence and untiring industry in sanitary well doing. Much of which work will be for you and your officials of a disagreeable, some of it even a repulsive almost disgusting character; but all of it will become honourable, and something more than honourable, when it is undertaken."

The whole report carries out the spirit of the above extracts, and if speedy reforms do not follow, Dr. Pattin has at least cleared himself of responsibility. On school attendance Dr. Pattin makes the following remarks :—

School Attendance.—I have no hesitation in charging the schools in the city with having been the unwitting underproppers of a good deal of our scarlet fever, whooping cough, and measles. And when the ventilating arrangements of the buildings themselves, notably the older ones, are considered, the reason for this state of things is soon explained. I know perfectly well that the plans, etc., have been approved by the Education Department and declared to be satisfactory, but the gentlemen of the Education Department do not spend their days in schools, and one has to have very slender transactions with the office-trained officials in any Government Department to become acquainted with the fact that their fine sense of infallibility is not invariably proportionate to their practical wisdom. It may be laid down as a cardinal principle of school ventilation that any system which depends for its efficacy on the opening of windows* is by that fact alone sufficiently condemned; even supposing that you could get the teachers to keep the windows always open, and in practice you cannot. The proper method of ventilating schools in my judgment, and I have given much thought to the subject, is to be attained by raising the customary level of the floors and providing large air chambers beneath them. Chambers in which the incoming air can be cooled and if need arise, washed in the summer and warmed in the winter before passing through gratings into the schools above. Such gratings to be of large and freely distributed area to prevent draught (the draw-back in practice of introducing air through small appertures). I should suggest, for example, that the vertical support of each of the tiers of seats in a school be made of iron grating through which a continuous gentle, health protecting stream of air would flow. The said flow being assisted by aspirators in the roof to suck out the breathed-out air which, from being warmed in the lungs, would tend to rise. Of course, the embodiment of these principles in actual practice would mean additional cost in building, but the money would be abundantly saved in the rarity with which it would be necessary to close schools, as one has to do now to check the development of infectious diseases.

* Windows, though valuable adjuncts for ventilating purposes, being primarily intended for lighting purposes.

ANNOTATIONS.

Appointment of Medical Officer for St. Helens.

The St. Helens Corporation have appointed Dr. John Robertson, at present assistant medical officer of health, to succeed Dr. M'Nicoll, the medical officer, who has retired. The committees recommend the Council to fix the salary of Dr. Robertson at £400, rising by five equal annual instalments to £500. The new medical officer is required to devote the whole of his time to the duties of the office. The Town Council at the same time expressed their cordial appreciation of the long and valued services rendered by Dr. M'Nicoll to the town.

The Infectiousness of Enteric Fever.

I venture to say that a mistaken impression is conveyed to persons sometimes even by the medical attendant in his desire not to excite unnecessary anxiety as to the illness, in stating, as is so often told us, that there is no infection from cases of this fever. That is probably the correct view of cases of enteric fever as treated in hospitals under the care of well-trained nurses; but in ordinary cottages, without any adequate notion of the use of disinfectants, and how to deal with soiled linen, my experience throughout the whole of my districts is, that there is a very distinct likelihood of the disease spreading to others, and that far more care is necessary in dealing with such cases—*Dr. Mitchell Wilson: Annual Report, Tadcaster*, 1893.

Choleraic Diarrhœa.

Dr. Mitchell Wilson, in his 1893 report for the rural sanitary district of Doncaster, says: "In September I reported upon a death from choleraic diarrhœa. The patient had come home ailing from the seaside; he was within two days seized with violent purging, sickness, and cramps. He rallied for twenty-four hours, but died from exhaustion. The case was considered so serious as to require the destruction of everything likely to have been infected. In October two children were similarly attacked in another part of the district; one died after two days' illness When the second began it was thought advisable to send a portion of the rice-water-like stools to Dr. Klein for examination. His report was 'that culturally the material is not distinguishable from true cholera.' A subsequent examination of the well from which the drinking water was obtained showed that it had drains containing large deposits of nearly solid filth on three sides and running very near to it. The sides of the well in the upper half showed abundant signs of liquid filth having run down into the water. The water had been previously analysed and condemned as being quite unfit to use, before the well was opened, and the use discontinued. In this case also everything likely to retain infection was destroyed."

Sporadic Case of Cholera.

Dr. Mair reports: "One case of cholera occurred in Mitcham in September, 1893. I reported it fully to the authority at the time, and an account of the case was also published in the *British Medical Journal* (November 25th, 1893). The case was fatal, and it will be recollected that although the case could not be connected with any previous case, in spite of careful inquiry by Dr. Seaton and myself, yet Dr. Klein, of the Local Government Board, found in the material that was sent to him the particular kind of 'comma bacillus,' which is, at any rate, the invariable accompaniment of true Asiatic cholera, and, so far as is known at present, of no other disease. Apart from Dr. Klein's statement, everything pointed to the case being one of ordinary 'English cholera,' or 'cholera nostras.' Very vigorous measures were taken to prevent the spread of the disease, and it is a matter for congratulation that there is only one case to report."—*From Dr. Seaton's Report to the Surrey County Council.*

Grimsby Oysters and Cholera.

Dr. Priestley, M.O.H. for Leicester, describes in his annual report a case of Asiatic cholera. The patient was seventy-four years of age. The diagnosis was afterwards confirmed by Dr. Klein. The case was in all probability an imported one from Cleethorpes through the medium of oysters. Accordingly, all oysters found on the premises (including bags, tubs, etc.), together with all the contents of the room in which the patient had been lying, *i.e.*, bedding, carpets, etc., were taken to the destructor and burnt, after being thoroughly well soaked with strong acid perchloride of mercury solution.

Grimsby as a Cholera Focus.

Early in September I visited Grimsby and Hull for the purpose of judging how far there was danger of the disease spreading to London. I found very active measures being taken in both places, and soon made up my mind that very little danger need be apprehended from Hull at any rate, on account of the excellent state of preparation and thorough sanitary organisation of the town. At Grimsby it was different. In certain important respects the town was in a dangerously insanitary condition, which could not be viewed without grave anxiety, considering the special character of the place as the centre of our fish trade, and the popularity as a pleasure resort of the neighbouring Cleethorpes, which was also affected. Events proved that there was abundant ground for anxiety. On September 5th a case of cholera occurred at Rotherham in the person of a man who had visited Grimsby on the previous day, and it was followed by another on the 10th. On the 7th a case was reported from Doncaster as having occurred on the receipt of a

consignment of oysters from Cleethorpes. On the 9th another occurred at Leicester, and again oysters from Cleethorpes were concerned. I do not propose to go through the whole list in detail, but will merely mention that during September and October cases were reported from the following places: Leeds, Rotherham, Bradford, Doncaster, Retford, Hartlepool, Boston, Gainsborough, Leicester, Hereford, Middleton, Ashbourne, Liverpool, Manchester, Yarmouth, Halifax, Derby, Newcastle, Shields, Gloucester, Ashton-under-Lyne, Keighley, Ilkeston, Rowley Regis, Idle, Malton, and perhaps some others. In the majority the nature of the disease was fully established, and in a considerable proportion of them a direct connection with Grimsby could be traced. There can be no doubt that it constituted a genuine cholera focus.—*From Dr. Shadwell's Report to the M. A. Board.*

Small-Pox Infection by Books.

As showing the extremely diffusible nature of the poison of small-pox, the following case is worth putting on record: A building society's book was kept under the pillow of one of these patients until his death. It was then taken in charge by his son, who lived at another part of the town, and without disinfection was kept for four weeks in his house. Being a saleable article, it was taken and offered for sale to an artisan who kept it over night. While there this artisan's wife perused the book, with a result that 14 days afterwards she developed the rash of small-pox.—*From Dr. Nicholl's Report, St. Helens*, 1893.

Anchylostomiasis.

According to Dr. F. M. Sandwith (*Lancet*, June 2nd, 1894) this disease is not so often due, as represented in European text-books, to the drinking of water containing the embryoes of the worm, as to the swallowing of the embryoes in dirty solid food. It occurs especially among brick workers and earth workers. It may enter the mouth with unwashed vegetables, or from unwashed hands coming straight from tilling contaminated earth. Among the Egyptian labourers the soil about the huts is sodden with excrement, and the embryoes are often transferred from the feet to the mouth of those who sit cross-legged at their meals. The chief symptom produced by this worm is anæmia, due to duodenal hæmorrhage. Thymol is as efficient in evacuating the anchylostoma as male fern is for tapeworm.

School Attendance and Diphtheria.

Dr. Sweeting, in reporting to the Local Government Board on the prevalence of diphtheria in a rural district in Hampshire, comes to the conclusion that "School attendance seemed to be the dominant influence at work in propagating the disease throughout Chawton. The following are the principal reasons in support of this view: (1) In almost every invaded family in Chawton the first sufferer was a school attendant. (2) In some cases the only one attacked in a family was the only one who attended school. (3) Certain school attendants escaped who ceased attending school directly other cases appeared in their families. (4) In some instances school attendants who were attacked were attending school up to the date of their attack; in others they had been to school only a few days before being attacked. (5) Those who escaped in certain families were generally non-schoolgoers. (6) Generally, school attendants were attacked less during the time school was closed than during the time school was open." He urges the necessity for the medical recognition and early notification, during an outbreak of diphtheria, of all cases of sore throat.

The Use of Urban Isolation Hospitals by Rural Districts.

Dr. Seaton in his annual report for 1893 remarks: "I cannot altogether be silent on the practice, which is still permitted, of sending cases from rural districts into towns for isolation! I observe this has been stopped by the authorities of Croydon Borough, but cases of small-pox are still allowed to be removed from distant country places in Surrey to the small-pox hospital at Highgate!"

The Closure of Insanitary Houses in Rural Districts.

The closure of houses on the ground of their being unfit for occupation is attended with more difficulty even than the abatement of over-crowding. For, the occupation of a house which is in such a condition as to justify an order being made for its closure clearly indicates that the occupier, if a tenant, cannot afford to rent or, if he can do so, cannot obtain a better one in the same locality; and if he be an owner, that he is too poor to effect the necessary repairs. Now the great bulk of the occupiers of the combined district whose houses are below a reasonable standard of habitability are cottage occupiers in rural districts, either occupying their own houses or living in houses which belong to persons who are almost as poor as themselves, or practically paying no rent for their occupancy, except for the land which is connected with their cottage. To close their dwellings, except when a favourable opportunity offers for so doing, means either to pauperise the occupiers or to drive them from the scene of their livelihood. The cases in which the threat of closure is most useful are those in which the landlord can afford to make the house habitable, but will not spend any money on it unless compelled. The death of the occupier occasionally gives one an opportunity of closing a house which it has not been practicable to deal with during his life. In

this way something less than a dozen houses have been closed throughout the combined district during the past year, but in no instance have formal proceedings for closure required to be taken.—*Annual Report*, 1893, *Dr. F. T. Bond, Gloucester Combined District.*

Blackpool Improvement Act, 1893.

This new local Act contains the following among other sanitary provisions: Section 40 prohibits the blowing, inflating, or stuffing the carcass of any animal slaughtered in any slaughter-house in the borough. Section 68 contains an important provision not only as to the ventilation around dwellings but also as to the removal of refuse in that every new continuous line of dwelling-houses is to have in connection with it a back street 12 feet in width. Courts and passages are required to be flagged, etc. Section 70 requires the back yards of all new houses to be flagged for at least 150 square feet. Section 75 gives power to prohibit cellars in districts liable to floods. Slaughter-houses are not to communicate internally with dwelling-houses. Section 77 gives the corporation summary power to provide sinks and drains for buildings which do not possess proper sinks, drains, etc., for carrying off refuse water. Owners of dwelling-houses can be compelled to provide regulation ashtubs or pails. A penalty is imposed for non-compliance with an order of the Court to close a polluted well, etc. The corporation has power to contribute funds to hospitals, other than infectious diseases' hospitals, and power to make bye-laws with regard to the admission to, and discharge of patients from hospitals belonging to them. The corporation is given a discretionary power with regard to the registration of a keeper of a common lodging-house. The Court has power also to cancel the registration of such common lodging-house keeper after one offence only.

The London County New Tribunal of Appeal.

It is perhaps not generally known that, under the provisions of the London Council General Powers Act, 1893, no person is now allowed to erect or adapt any building to be used wholly or in part as a dwelling-house upon land, the surface of which is below the level of Trinity high water mark, except with the permission of the Council, and in accordance with such regulations as the Council may from time to time prescribe with reference to the erection of buildings on such land; and further, that a tribunal of appeal has been appointed under the same Act to consider appeals made by persons to whom permission may have been refused. This tribunal consists of three members, nominated by the London County Council, by the president of the Institution of Civil Engineers, and by the Council of the Royal Institute of British Architects respectively. Dr. Thomas Orme Dudfield (medical officer of health for Kensington) sits on behalf of the County Council, Mr. John Charles Coode on behalf of the Civil Engineers, and Mr. Arthur Cates on behalf of the Institute.—*Journal of the Royal Institute of British Architects.*

Diphtheria at Rainham (Essex).

Mr. Evan Evans, inspector to the Local Government Board, in reporting on the prevalence of diphtheria at Rainham, states that the following circumstances seem to have conduced to its propagation: (1) Personal communication among children in the elementary school, and personal communication also amongst members of invaded households, and amongst neighbours and visiting acquaintances; (2) transmission of infection by means of mild cases of "sore throat," and through convalescents in an infectious condition; (3) overcrowding and want of through ventilation in some of the smaller cottages; (4) the percolation of sewage matter into dwellings, thereby perhaps rendering the inhabitants more prone to attack; (5) want of hospital provision for the isolation of persons suffering from infectious disease, and neglect of systematic disinfection of infected dwellings, and of the clothes and bedding of sufferers from diphtheria after their recovery or death from the disease.

Port Sanitary Inspection.

Port medical inspection as practised in England under the Cholera Orders is apt to be misunderstood, and consequently the importance of the introduction of cases into England, through this "first line of defence," may be over-rated as evidence of failure of the system.

Port medical inspection is not an improved form of "quarantine," but in place of "quarantine" (or detention of ships and crews, healthy or infected, for long periods), it substitutes a rational system, the essence of which is this:—

1. By medical inspection of arrivals it will detect *actual* cases of cholera, and secure hospital isolation of patients and disinfection of their belongings.
2. By the same medical inspection, cases apparently sickening will be isolated and watched.
3. Cases not yet sickening, but *possibly* incubating the disease, will remain undetected, and these are *notified forward* to the sanitary authority of the district whither they are bound. This authority then becomes responsible for the watching and dealing with any case amongst such arrivals.

Shortly, medical inspection *deals with* actual and probable cases, but can only *notify forwards* possible cases. The occurrence of these cases is thus in no sense a breakdown of the English

system, which involves preparation against cholera not only in port districts, but also in every inland sanitary district in England.

Fortunately, the incubation period of cholera is generally short (a few days only), so that a long distance ship with no recent cases on board involves, as a rule, little danger.—*From the Annual Report for* 1893 *of Dr. Davies, Port M.O.H. for Bristol.*

Cremation in America.

The history of cremation in America is interesting; crematories, cremation societies, and the number of bodies cremated are rapidly increasing in the United States. We have two crematories in California; one in Los Angelos, which was erected in 1887, and one in Cypress Lawn, San Mateo county; the latter, although only four months in operation, has cremated nearly a hundred bodies. It is but nine years since the first human body was cremated in the State of New York. At the present time, the United States Government has a crematory on an island in New York Harbour for the incineration of the bodies of those who die of contagious diseases; while New York City, Buffalo, Troy, and many other cities have their crematories. Most of the large cities in other States now have their crematories, and it is pleasing and safe to state that inhumation, or earth burial, is beginning to give place to the safer, less expensive, and altogether more desirable method—cremation.—*Dr. McNutt in the "Pacific Medical Journal," May,* 1894.

Surface Contamination of Wells.

In an interesting series of articles by Professor Koch, published in the *Scotsman*, a cheap and practicable method of protecting wells from surface contamination is described. A lining of good puddle clay, well rammed, should be carried down, outside the retaining wall, for a distance of from eight to ten feet. The retaining wall and its impervious lining ought to be brought up to the surface, or the well covered below the surface by a thick layer of cement. Surface water cannot then gain access to the well until it has filtered through the soil for at least ten feet, and been to a large extent purified. In this district the retaining walls are seldom brought up to and beyond the surface of the ground, the lining of clay or cement is rarely more than eighteen inches in depth, and the covers of wells are usually constructed of flags or wood. When cement is used for steining, it is frequently applied to the inside of the retaining wall, so that surface water on reaching the wall can trickle down into the well without being filtered in any way. Where the pipe to the pump passes through the cover there is commonly a ready channel for the entrance of surface water; and, as there is often a drinking trough for cattle near, the washings of the surface of the ground are filthy in the extreme. A gully connected with a sound cement jointed drain ought to be placed under the spout of the pump in order that scourings of vessels and spilt water may not find their way back into the well, and the pump ought not to be placed immediately over the well, but at a little distance. In some instances, overflow pipes have been found connecting wells with drains; these ought not to be allowed under any circumstances, as, on the drain becoming choked, sewage may be backed up the pipe and escape into the well.—*From Dr. M. J. Oliver's Report for* 1893 *to the County Council of Roxburgh.*

The Lambeth Sewer Fatality.

Two men were suffocated in the Stamford Street sewer on May 4th. The men died at St. Thomas's Hospital, and at the inquest Mr. Merry, house physician, gave evidence that death was due to poisoning by sulphuretted hydrogen. Dr. John Muter, the public analyst for Lambeth, said he had analysed some sewage taken from the sewer in question, and found sulphuric acid and sulphuretted hydrogen. A sample of liquid taken from the drain of the Commercial Road Oil Refinery evolved sulphuric acid, but no sulphuretted hydrogen. It was a well-ascertained fact that sulphuric acid in a sewer would generate sulphuretted hydrogen. Dr. H. W. Verdon, medical officer for Lambeth, believed that something unusual occurred at the oil refinery on the day of the disaster, whereby a large amount of acid got into the sewer, causing the sudden generation of 10 per cent. of sulphuretted hydrogen. Mr. J. G. Lambert, of Messrs. Younghusband and Barnes' Oil Refinery, said he never allowed his residuals to run into the sewer, as they formed a valuable marketable commodity. Nothing unusual took place on the day of the occurrence.

The Consumption of Alcohol in Hospitals.

Dr. J. J. Ridge in a paper in the *Medical Pioneer* draws attention to the satisfactory diminution in the administration of alcohol in workhouses and hospitals. The figures give a clue to the present state of medical opinion. At Guy's Hospital the expenditure on alcohol in 1862 with 494 beds was £1,716; in 1892 with 695 beds, £318. At St. George's Hospital there was only a slight reduction; at University College Hospital in 1862 the expenditure was £548 for 140 beds; in 1892 £284 for 207 beds; at Westminster Hospital in 1862 £639 for 160 beds; in 1892 £289 for 205 beds. In 1891 a Parliamentary return was issued, showing the amount of spirits, wine, and malt liquors consumed in each workhouse in England and Wales, Scotland and Ireland. This return showed that the amount spent in 1871 was £82,554, in 1881 was £60,303, in 1891 was £34,332. Hence there was a reduction in 20 years of £48,222, or 60 per cent. In 1891 there were 5,494 more paupers than in 1881, and they consumed £25,971 worth less of intoxicants.

ANALYTICAL NOTES.

A SIMPLE apparatus for the analysis of gases dissolved in water has recently been devised by Mr. Sidney Harvey. It consists of a globular spindle-shaped glass vessel having two opposite tapering necks about 14 inches long between extremities, and the globular part nearly 3½ inches diameter. This is placed in a water bath through the bottom of which the lower neck is passed and connected by two feet of capillary pressure tubing to a mercury reservoir. The water level in the bath just covers the globe, leaving the top neck projecting above the surface; this is connected again with an ordinary nitrometer. The apparatus is used as follows: The globe is filled two-thirds full with the water to be examined, the remaining third part being filled with mercury forced up from the reservoir. The water in the bath is now heated to boiling point, and under the diminished pressure brought about by lowering the mercury reservoir, the water in the globe boils vigorously, and after two hours the dissolved gases will be found collected in the upper neck of globe, from which they are drawn off, measured, and analysed.

THE advantages claimed for the above apparatus are as follows: The apparatus while working requires little attention. The water treated together with the evolved gases do not leave the vessel until the end of the operation, when the latter are delivered free from moisture into the measuring tube. There are no corks, perforated or otherwise, and but few connections, while the latter are of a character admitting of being secured against leakage.

THE results of analysis of three samples of water taken from wells in close proximity to churchyards are of interest. The analyses which were made by Dr. Voelcker, and reported on adversely, resulted as follows:—

	1. Grains per gall.	2. Grains per gall.	3 Grains per gall.
Total solids	23·52	38·36	69·99
Oxygen absorbed	·039	·066	·055
Chlorine	2·28	4·02	6·78
Equal to sodium chloride ...	3·65	6·57	11·07
Nitric acid	3·67	5·13	12·87
Free ammonia	·006	·0005	·0005
Albuminoid ammonia ...	·006	·013	·013
Phosphoric acid	·29	·34	·52
Equal to phosphate of lime	·59	·74	1·13

The wells from which waters Nos. 1 and 2 were taken were only 25 to 30 ft. from a churchyard, and two members of a family who had drunk of the No. 2 water had since died of pronounced diphtheria. On further inquiry, it was found that well No. 2 was only some 50 ft. distant from several recent burials; well No. 1 was 140 ft. from one recent burial. The subsoil was hard gravel.

MR. GEORGE R. THOMPSON has been appointed district agricultural analyst for the County of Monmouthshire and the County Borough of Newport.

ONE of the chief objections to volumetric precipitation processes is that in direct reading the end-point is possible, filtration and trial of small portions of the clear filtrate being usually necessary. P. N. Raikon has found that many precipitates which remain obstinately suspended under ordinary conditions, and cause the liquid being titrated an unmanageable turbidity, can be induced to collect and subside by the addition of some immiscible liquid heavier than water, *e.g.*, carbon disulphide or chloroform. Such liquids, although exerting no solvent effect on the precipitate, mix intimately with it and carry it down, leaving the supernatent liquid sufficiently clear for the observation of any turbidity produced by the addition of a further quantity of the standard precipitating solution. Carbon disulphide is more effective for silver chloride, while chloroform is better for barium sulphate.

A. JOLLES, in the *Zeit. Anal. Chem.* 32, describes his method of estimating nitrites in urine. He takes 100 c.c. of urine and decolourises it by warming it to 40° and shaking with a small quantity of animal charcoal; to this quantity, in a stoppered cylinder, acidified with sulphuric acid, he adds 1 c.c. of sulphanilic acid, and, after a few minutes, 1 c.c. of naphthylanine; 0·032 mgrm. of N_2O_3 will develop a rose-coloured tint in twenty-five minutes. For more highly dilute solutions of nitrites he suggests the use of Tromonsdorf's zinc iodide-starch method, though there are objections to its use owing to the possible absorption of the iodine by the pathological constituents of the urine.

J. NEUMAN, in the *Milch Zeit.*, records the result of adding 100 grams of calcium phosphate to the usual food of each of three cows for a period of five weeks. The average percentage amount of lime and phosphoric acid in the milk before and after adding the phosphate to the food was as follows:—

	CaO.	P_2O_5.
Without calcium phosphate	0·1479 ...	0·1960
With ,, ,, ...	0·1592 ...	0·2312

The results show an appreciable increase in both the calcium and phosphorous, although the food of the cows previous to the experiment contained a sufficient quantity of "mineral salts." No increase was apparent until three or four weeks, and this accounts, perhaps, for the negative results obtained by other investigators.

CORRESPONDENCE.

THE EIGHTH INTERNATIONAL CONGRESS OF HYGIENE AND DEMOGRAPHY.

To the Editor of PUBLIC HEALTH.

SIR,—My committee would be much obliged if you could kindly insert a notice in your paper to the effect that a British Committee, of which Sir Douglas Galton, K.C.B., F.R.S., is the chairman, and Professor W. H. Corfield, M.A., M.D. (Oxon), is the treasurer, has been formed to further the interests in this country of the eighth International Congress of Hygiene and Demography, which is to be held in Budapest from the 1st to the 8th of September this year. Any information may be obtained about the Congress from the Hon. Secretary, Dr. Paul F. Moline, 42, Walton Street, Chelsea, S.W.—I am, etc.,

PAUL F. MOLINE, Hon. Sec. British Committee.
49, Walton Street, Chelsea, London, S.W.,
June 9th, 1894.

SEWAGE-FED "FISH."

To the Editor of PUBLIC HEALTH.

SIR,—I see in your number for June an article by Mr. J. Lawrence Hamilton, M.R.C.S., on the above subject. He leaves out (perhaps, as regards sea fish, the most sewage-loving animal of any) the shrimp.

At the Blackpool outlet you were always sure of some shrimps, and the nearer to it you could get the more shrimps you got.

I have examined the stomachs of shrimps taken near that outlet, and in every case found them full of muscular fibre.

The Lancashire Sea Fishery Committee has closed the ground opposite to Blackpool, so that none are taken near there now.

The outlet of the "St. Anne's on the Sea" sewer is close to a very extensive mussel bed, and after the Kingstown and Kiel cases it will want careful watching.

The Southport sewage is discharged into a pool that meanders through sandbanks with many cockles on them, and a good deal of shrimping is done by hand-nets and carts in the pool.

Lytham sewage is also put into a pool, and shrimps are taken not far from the outlet.

There is no doubt but the sewage does provide, directly and indirectly, food for many shellfish, and they, in their young stages, form the chief food for the flat fish.

So that if sewage is put into the sea it is quite as valuable to the nation as if put on the land, and with a great lessening of the expense.—I am, etc.,

11, Park Street, Lytham. ROBERT LAMB ASCROFT.

THE INFLUENCE OF SANITATION ON THE RACE.

To the Editor of PUBLIC HEALTH.

SIR,—Dr. Haycraft's lectures have been noticed more than once in your columns, and his startling conclusions criticised. If there was any good reason for accepting these, sanitarians and social reformers might well pause and consider their ways. But, having tested the data on which these conclusions are built up, in the one particular easily available, *i.e.*, the Registrar-General's Annual Report for 1881, I found them to be utterly unreliable, and, to my mind, the whole fabric fell.

What are Dr. Haycraft's statements with reference to Table XVII. (17 it should be) of this report?

1. In all cases in the first group (zymotic), except puerperal fever, there is a marked diminution from 1858 to 1890.
2. There is an increase in almost all the hereditary diseases.
3. There is a large increase in "diseases of the respiratory system, due in part to the increasing number of tuberculous patients, who kept from inroads of microbes, nevertheless readily fall a prey to other affections."

What are the facts?

1. There is only a distinct diminution in ten of the zymotic diseases (or rather disease headings); there is an increase in five, and in three no distinct change can be seen.
2. Of the constitutional or hereditary diseases there is a distinct increase only in cancer and diabetes, of which possibly the former, and almost certainly the latter, are due to nomenclature only.
3. The increase in diseases of the respiratory system is less than 10 per cent., being a decrease from 1871.

These are three distinct inaccuracies, but the whole passage with respect to this Table is written in so loose and careless a way, and the interpretations placed on the lessons of the Table so opposed to knowledge and experience, that in my opinion it invalidates the whole argument of the lectures.

Surely revolutionary theories should not be put forth on such a tottering basis of facts.

In all probability the increase in diseases of the respiratory system, which appears to have taken place from 1858 to 1876, is wholly due to the introduction of the stethoscope into general practice, and the consequent more frequent discovery of pneumonia and other diseases of the lungs, which had previously been classed under fevers, etc.—I am, etc., SIDNEY DAVIES, M.A., M.D.,
M.O.H. Plumstead.

APPOINTMENTS.

MEDICAL OFFICERS OF HEALTH.

ALLOTT, W. L., M.R.C.S.Eng., L.R.C.P.Edin., re-appointed M.O.H. to the Hayland Local Board.

FISHER, JOHN BELL, M.B., C.M.Edin., re-appointed M.O.H. for the Whitehaven R.S.D.

GROVE, WILLIAM RICHARD, M.D.St. And., M.R.C.S. Eng., re-appointed M.O.H. for St. Ives.

MUDGE, JAMES, L.R.C.P.Edin., M.R.C.S.Eng., re-appointed M.O.H. to the Penzance R.S.A.

NORTON, J., M.D., M.R.C.S., appointed M.O.H. to the Vestry of St. Margaret and St. John, Westminster.

PALMER, HAROLD LEWIS, M.R.C.S.Eng., re-appointed M.O.H. for the Newtown U.S.D.

PALMER, A. M., L.R.C.P.Edin., M.R.C.S.Eng., re-appointed M.O.H. to the Whittington U.S.D.

POGSON, W., F.R.C.S., L.R.C.P.E., has been re-appointed M.O.H. for the Leeds R.S.A.

ROBINSON, EDWARD STANLEY, M.R.C.S., L.R.C.P. Lond., re-appointed M.O.H. for Stourport.

STEELE, ION, L.R.C.P. and S.Edin., re-appointed M.O.H. to the Kidsgrove Local Board.

SHORTRIDGE, THOS. WOOD, M.D.Brux., L.R.C.P., L.R.C.S.A.Edin., re-appointed M.O.H. for Honiton.

SYMES, W. S., L.R.C.P., L.R.C.S.I., re-appointed M.O.H. for the Newbold U.S.Dispensary.

THOMPSON, W. H., M.D.Durh., L.R.C.P., L.R.C.S. Edin., re-appointed M.O.H. for the Quarry Bank U.S.D.

THE POWERS OF THE METROPOLITAN ASYLUMS BOARD.—The London County Council, after receiving an elaborate report from a special committee, have passed the following resolution: "That all central metropolitan powers in regard to public health should be in the hands of a body composed of elected representatives of the ratepayers, and that the London County Council, being the central metropolitan health authority, the powers of the Metropolitan Asylums Board, relating to the accommodation for the infectious sick and the administration of infectious hospitals, cholera nursing, etc., and of the ambulance service, should be transferred to the Council."

PUBLIC HEALTH,

The Journal of the Incorporated Society of Medical Officers of Health.

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ANNUAL PROVINCIAL MEETING OF THE INCORPORATED SOCIETY OF MEDICAL OFFICERS OF HEALTH.

THE annual provincial meeting of the Society was held on Saturday, July 21st, at the Caversham Bridge Hotel, Reading, at a quarter to twelve a.m. Present: Dr. Woodforde (president), Drs. Sykes, Fowler, Manley, Gruggen, W. R. Smith, Lovett, Roberts, Armstrong, T. O. Dudfield, Ashby, R. Dudfield, Wynter Blyth, Newsholme, Mr. H. C. Jones (hon. solicitor), and Dr. Thresh (hon. secretary).

The Hon. Secretary having mentioned that the minutes of the last provincial meeting, which was held in Newcastle in August last, were published in the Society's journal (September, 1893), it was unanimously resolved to take them as read. The Hon. Secretary then read the report of the Council, selecting Reading as the place for holding the provincial meeting, and referring the subject of "Medical Practice by Unqualified Practitioners in its Bearing upon Public Health" to that meeting for consideration.

A letter was read from Dr. T. E. Hill, M.O.H. Durham County, expressing regret that he was unable to attend, and stating that in his county 5 per cent. of the total deaths were uncertified and that nine-tenths of these were the result of the prevalence of unqualified medical practice. He also referred the meeting to the statistics given in his paper read before the Society in May last. The following letter from the Hon. Secretary of the Yorkshire Branch was also read:—

Town Hall, Huddersfield, July 10th, 1894.

DEAR SIR,—As hon. secretary I have been instructed to forward you the following resolution anent "Medical practice by unqualified persons": "That the Yorkshire Branch have not at present sufficient information to enable the members to come to a decision on this question, and urge the Central Association to take evidence on the statements made by the Northern Branch, and then to submit the facts to each of the branches for their consideration."—I am, yours faithfully, JAMES R. KAYE.

Dr. F. Wightwick.

After some discussion it was unanimously resolved, on the motion of Dr. WYNTER BLYTH, seconded by Dr. T. O. DUDFIELD, "That the subject of 'Medical Practice by Unqualified Practitioners in its Bearing upon Public Health' be referred to the various branches for consideration, their attention at the same time being called to the minutes of evidence on this question published in the report of the Select Committee of the House of Commons on 'Death Certification,' and to the paper by Dr. T. E. Hill, read before the Society in May last and published in the June number of PUBLIC HEALTH."

A vote of thanks to the President brought the meeting to a termination.

RIVER EXCURSION.

Most of the Fellows who attended the above meeting had journeyed down from Paddington by the 10.17 a.m. train, fully anticipating from the continued drizzle and the gloomy appearance overhead that the weather would take most of the interest out of the day's proceedings. By the time the party arrived at Reading these gloomy forebodings were being dispelled, and each and all felt that there was a decided possibility of reaping a reward for responding to the call of duty by attending the provincial meeting. After having transferred the consideration of "Unqualified medical practice" to the branches, the Fellows promptly rejoined the ladies, who had very patiently waited in the garden of the hotel, and all embarked upon the launch which, with "steam up," was ready to depart. From this time the clouds lifted; through the rifts the blue sky was visible, and in sunshine and shadow the panorama of the Thames was revealed in all its beauty. The thoughtful kindness of the President was immediately noticed, since refreshments had been placed on board for those who had been travelling from early morning. To add further to the enjoyment a piano and violin had been taken on board, and a

lady and gentleman, engaged from Binfield's, supplied vocal and instrumental music which would have soothed even a savage breast had there been one on board, which there was not. Soon after two o'clock Henley was reached, and a party of forty sat down to a lunch, which was thoroughly enjoyed, and which reflected great credit upon Mr. Shephard, the host of the Red Lion. After lunch Dr. Armstrong proposed "The Health of the President," and thanked him for the admirable arrangements he had made to ensure the success of the meeting. Dr. Gibbon, as the oldest member of the public health service present, also eulogized the President. Dr. Woodforde having responded, Mr. Jones toasted "The Ladies," and Dr. R. Dudfield, as the only bachelor present, replied. By half-past three the party was again gliding down the river, and during the afternoon the lovely scenery was enjoyed to the delightful accompaniment of music, strawberries and cream, and afternoon tea. Maidenhead was reached at seven o'clock, and the inner man was again refreshed at Woodhouse's New Thames Hotel, the repast being called "high tea." The amount of lobster salad which disappeared would have led anyone unacquainted with the appetising effect of an excursion on the Thames to conclude that the party had been unable to find time to lunch. After tea a sense of oppression was experienced, which the cynically disposed attributed to the refreshments consumed, but which the majority, more correctly diagnosed as being due to regret that so enjoyable a day was so near its end. Leaving Taplow at 8.40 Paddington was soon reached, and leave-taking commenced, each and all declaring that a more pleasant provincial meeting had never been held.

CHOLERA PRECAUTIONS AT HULL.

The Sanitary Committee of the Town Council of Hull have published in full their proceedings and those of the Medical and Cholera Sub-Committees during 1893. These give an interesting and complete account of the action taken in preventing cholera from taking root in the town, and the further steps to prevent its spread when once imported. Throughout the whole of the report there is evidence of the inspiring skill and power of organisation of Dr. Mason, the medical officer of health for the town and port; and we congratulate him on the success of the work which was accomplished under trying circumstances. The celerity and completeness of the machinery in work may be gathered from the following instance:—

Within half an hour of the death of the second case of cholera Dr. Mason had visited the house, ordered all the gullies in the neighbourhood to be flushed, made arrangements for removing the body to the mortuary, destroyed or disinfected all articles soiled by discharges at the destructor or disinfector, and closed the infected dwelling. At twelve o'clock, *i.e.*, within an hour of the death, the Cholera Sub Committee met and received his report on the case.

PROCEEDINGS OF THE YORKSHIRE BRANCH OF THE INCORPORATED SOCIETY OF MEDICAL OFFICERS OF HEALTH.

The annual meeting of the branch was held in the Town Hall, Wakefield, on June 26th, 1894. The following were present: Dr. Spottiswoode Cameron (in the chair), Drs. Wade, Bond, Kaye, Johnstone, Mitchell Wilson, Higgins, Smith, Young, Drake, Aston, Ainley, Ramsden, Hunter, Webster, Evans, Buchanan, Fisher, and Mason. The following visitors were also present: Mr. Councillor G. A. Moorhouse (chairman, Wakefield Sanitary Commitee), Mr. Alderman Nicholson, Mr. C. J. Hudson (town clerk), and Mr. Whittaker (sanitary inspector).

Apologies for non-attendance were read from Dr. Whitelegge (retiring president), Drs. Roberts, Littlejohn, and Atkinson.

The minutes of the previous meeting were read and confirmed.

The following new member was elected: A. G. Webster, M.R.C.S.E., medical officer of health for Colne Valley Combined Sanitary Districts.

The rules as revised by the Council were again submitted and finally adopted.

The report of the Council for the year 1893-4 was read and adopted.

Annual Report for 1893-4.

The Council, in presenting their annual report for 1893-4, have much pleasure in recording the continued success of the Yorkshire Branch.

With a view to increasing the membership of the branch, an invitation has been extended to all medical officers of health of Yorkshire, not members of the branch, inviting them to join the society. During the year twenty-three new members have been elected. The total membership now numbers seventy-seven, the greatest number since the branch was first founded.

Three meetings have been held during the year, all of which have been largely attended; the contributions have been varied, and the discussions of local and public interest.

The following are the titles of the papers read and discussed at the various meetings, viz.:—

"Typhus Fever," by Dr. Robinson, Rotherham; "Notes on Cholera," by Dr. Mason, Hull; discussion on the "Prevention of Infectious Diseases," introduced by (1) Dr. Spottiswoode Cameron, Leeds, on methods of disinfection and extent to which it is desirable to go in dealing with different classes of diseases; (2) Dr. Kaye, Huddersfield, on prevention of infection amongst school children; and (3) Dr. Johnstone, Ilkley, on isolation at home and in hospital.

During the year the Council have had under consideration the revision of the existing rules of

the branch, and now only await their final adoption at the annual meeting.

At the instance of the Birmingham and Midland Branch a conference of the councils of the branches of the Incorporated Sociey of Medical Officers of Health was held at Manchester on April 28th, 1894, for the purpose of formulating suggestions to be submitted for the consideration of the special sub-committee appointed by the Society to report upon the advisability of modifying the articles of association.

The branches represented were the North-Western, Yorkshire, and the Birmingham and Midland Branch, and the resolutions printed on page 324 of PUBLIC HEALTH for July, 1894, were unanimously approved.

It is with deep regret the Society have to record the loss, through death, of Dr. J. Burley Walker, of Golcar, who was an active and earnest worker of the Society, and for many years a member of the council.

We have also to deplore the recent death of Mr. S. W. North, at whose instigation and at whose house this branch as the Yorkshire Association of Medical Officers of Health was first initiated in 1875.

The election of officers for the ensuing year then took place, and resulted as follows :—

President.—J. Wright Mason (Hull).

Vice-Presidents.—Dr. Whitelegge (West Riding County Council), Mr. W. Burman (Wath), Dr. J. S. Cameron (Leeds), Mr. F. E. Atkinson (Settle), Mr. Wade (Wakefield), Dr. Mitchell Wilson (Doncaster), Mr. W. H. F. Ramsden (Saddleworth), and Dr. Buchanan (Thirsk).

Committee.—Dr. E. Evans, Mr. W. Pogson, Dr. T. Johnstone, Mr. T. Smailes, Mr. T. Percival, Mr. J. T. B. Laverick, Dr. Harvey Littlejohn, Mr. W. S. Mackenzie, Mr. T. B. Fairclough, Dr. A. Buncle, Mr. W. L. Hunter, and Dr. A. Robinson.

Honorary Secretary and Treasurer.—Jas. Kaye (Huddersfield).

On behalf of the members of the branch, the President (J. Wright Mason) moved a vote of condolence with the family of the late Mr. S. W. North, as follows: "That the members of the Yorkshire Branch of the Incorporated Society of Medical Officers of Health record with much regret the death of Mr. S. W. North, for 21 years the medical officer of health to the City of York; the founder of this society in 1875; the first, and for many years its president; a man of broad ideas, high scientific attainments, and who did much by his noble work and example to advance the cause of public health and of this society. The Yorkshire Branch desire to express their sympathy with the family of the late Mr. North."

The following resolution, received from the Northern Branch, was read, viz.: "That, in the opinion of the Northern Branch, medical practice by unqualified persons, which prevails extensively in certain districts of Durham and Northumberland, and other parts of the county, interferes with efficient sanitary administration, and also directly and indirectly prejudicially affects the public health, and that it is desirable that the attention of Parliament be drawn to the necessity of further legislation to prevent such illegal practices, and that the Incorporated Society of Medical Officers of Health be requested to support the resolution, and forward it to the proper quarters."

Moved by Dr. MITCHELL WILSON, seconded by Dr. ASTON, "That the Yorkshire Branch have not at present sufficient information to enable the members to come to a decision on this question, and urge the Central Association to take evidence on the statements made by the Northern Branch, and then to submit the facts when obtained to each of the branches for their consideration."

A paper on "Slipshod Sanitation," illustrated by photographs, was read by Dr. Hunter (Pudsey).

SLIPSHOD SANITATION.

By W. L. HUNTER, M.D., M.O.H. for Pudsey.

In one of the well-known Manchester Health Lectures Dr. Noble discusses the point, why it is that in spite of the great amount of work done in recent times in advancing sanitary measures, there has not been a corresponding decrease in illness and the number of deaths as a result of all this work? He concludes that the personal habits of the people, such as taking too much drink, overwork, etc., accounts for this want of improvement. These causes, without doubt, operate powerfully in nullifying the good effects of sanitary work, but I think to a large extent its apparent failure may be reasonably explained by the fact that a great amount of the so-called sanitary work done is not sanitary work at all, and that it often not merely does little or no good, but does positive mischief, even aggravating the conditions that should have been improved by it; and that on the other hand it may be taken as proved that when sanitary measures are carried out thoroughly, and in their widest sense, a large reduction in the cases of sickness and in the death-rate may be expected to follow. Sanitary legislation affords an excellent example to begin with. This is the foundation of sanitary work, and everyone engaged in the public health service soon finds out what an unsafe foundation it is. First let us consider that weak-kneed class of legislation, the permissive sanitary Acts. These Acts are quickly adopted by the more advanced and enlightened places that need them least, while the backward districts where their operation is most required obstinately refuse to take advantage of the benefits to be obtained from them; and this can hardly be wondered at when it is considered that their adoption, or otherwise, is at times in the hands of men who know nothing, and, if possible,

care less, about sanitary matters; whose little importance is flattered by being able to reject an important measure; who often have a direct and selfish interest in refusing the Acts; and yet who are not wholly to blame, as they must have a shrewd suspicion that the very fact of the Acts being permissive proves that the framers of them had not entire confidence in their value.

The discretionary powers given to sanitary authorities with regard to the making of bye-laws and regulations is, I consider, to a certain extent, an evil of a similar kind, and likely to lead to want of thoroughness in sanitary reform. If certain bye-laws, such as the Local Government Board models, are worthy of recommendation, surely they might with benefit be at once applied to the whole country. There may be some local reasons for modifying them, but such exceptions could be arranged for without much difficulty.

Much worse than the passing of these permissive Acts is the fact that the compulsory Acts are only compulsory in theory, and, as a fact, they are to a great extent disregarded. It is a matter of daily knowledge that a great portion of what has been called the Sanitary Charter, the Public Health Act, 1875, is allowed to be a dead letter, ignored by the guardians of the public health.

The Vaccination Act affords another example of loose administration especially interesting at present. In some places the Act is not enforced at all, and in others the one mark, or what the Yankees would call the "one horse," system of vaccination is steadily on the increase.

As a reason for not enforcing sanitary laws, it is alleged that the public are not sufficiently educated to understand the importance of them. This seems to me rather an argument for giving effect to them. If there is any doubt about the good of a measure I can understand waiting for the development of public education; but when its utility is fully established, there can be little objection to strictly enforcing it. The "liberty of the subject" bugbear is another plea. This cuts both ways, and it is against reason that a man should be allowed to commit manslaughter by poisoning his neighbour's family by infectious disease, or with sewer gas from his defective drains. Besides, this same delicacy for private feeling is not shown so strongly in other matters, *e.g.*, in the collecting of rates and taxes, or in the stamping out of cattle diseases. These inefficient laws are frequently made less effective by the conditions under which they are administered. The sanitary staff of a number of the small districts exists only to satisfy the requirements of the Local Government Board, and the Local Government Board inspectors, when reporting on some grossly insanitary districts, record cases where, instead of sanitation progressing, it is actually retarded by the governing body. It is not uncommon to find a clerk who is over-worked, and underpaid; a medical officer who has no authoritative freedom in carrying out measures for the good of the public health. If he understands his work and tries to do his duty on the lines laid down by the Local Government Board, he does so, in all probability, at the expense of his private practice, and at the risk of offending the body that reappoints him. It is very natural for him, at such a cost, to decline to be a public benefactor, and so he as often as not takes his salary, in such a case easily earned, and gives little return for it in the shape of work. At the same time he pleases the sanitary authority, and so everything goes on pleasantly. There is, however, one drawback, the public health suffers. The same body may have a sanitary inspector, who absolutely knows nothing about sanitation, who has been appointed by some local influence, and whose sole qualification for the position is, that he was not very successful as a bootmaker, or a barber, before he was suddenly made sanitary inspector. Even if he understands his duties his appointment may be a yearly one, and anything like energetic work on his part might endanger his next reappointment.

If the death-rate be low the authority appointing such a staff as the above says, "Our efforts have been successful and we deserve all praise"; if unduly high, they call it "a visitation of Providence," and feel aggrieved.

The stamping out of infectious diseases is done in such a half-hearted, feeble way in some districts that little or no benefit can be expected to result. Scarlet fever being due to infection from one individual to another, either directly or indirectly, may fairly be considered a preventable disease, and although at present, as a result of preventive action, there is a marked diminution in the number of cases and deaths from it, as compared with former times, this lessening has not been what was anticipated, and only a very sanguine prophet would predict the final stamping out of the disease. The great difficulty of recognising extremely mild cases accounts, to some extent, for the failure of the means taken to limit this complaint, but I consider, at any rate at present, that it is an unnecessary refinement to take this as an explanation. A case of scarlet fever breaks out in a large family. The sanitary authorities hear of it by accident, and any efforts of theirs to prevent its spreading are met with the remark that "the doctor in attendance does not think it needful to have the case removed, and that everything is being done to prevent the infection spreading," and it is stated that the patient is strictly kept in one room away from everyone else, and that disinfectants are freely used.

This sounds very well, but we all know not the least reliance can be placed on such isolation. It is no unusual thing to find the mother nursing the desquamating patient in her arms, and a few

minutes afterwards washing the other children. These children play with others in the street. The father and elder children go to work, and regularly visit the infected room. The neighbours drop in frequently and sit for a long time. Sometimes a trained nurse is engaged, who walks all over the house, and takes her meals with the rest of the family. So much for isolation. The disinfecting may be equally energetic, and often consists of a saucer of Condy's fluid put under the bed. At the end of, perhaps, three weeks from the onset of the disease, word is sent to the sanitary authority that all necessary steps for disinfection have been taken, and that the house is now free from infection, and at times a certificate to that effect is accepted.

It has been shown by the researches of Drs. Bowditch, Buchanan, and others, that there is an intimate connection between moisture of the soil and many diseases, notably phthisis, and in a number of towns, what may be considered the accidental draining and drying of the subsoil by the construction of sewers, has resulted in a marked diminution in the death-rate from those diseases. If the relation of cause and effect be accepted, as I believe it is, in these cases, it seems to be a remarkable instance of want of completeness in sanitary work that few, if any, towns, either of their own free will or under the guidance or pressure of the controlling authorities, make any special and separate provision for draining when planning out sewage schemes.

It would not be difficult in all branches of sanitary administration to find examples of this dangerous want of thoroughness, but house drainage deserves attention especially. Draining as it is done under the supervision of many local authorities is as nearly often done wrong as right. I desire particularly to show by photographs and diagrams some glaring examples of bad drainage done within the past few years, and the good workmanship of which was supposed to be vouched for by the authorities having the official care of such matters. Most of them have come under my own notice, and for some I am indebted to Dr. Honeybrow, of Idle.

The first diagram shows a section of the drainage of an architecturally imposing Board school, built at a cost of £6,700, to accommodate 600 children.

The drainage of the school was connected without a trap to an offensive rubble sewer. The line and gradient of the drain-pipes were irregular. All the joints were open, and some of the pipes were actually from two to three inches apart. The privy middens and urinals of the schools were joined to the drain without any intercepting trap. Owing to there being no means of flushing or ventilating, combined with the bad construction, these drains had become very offensive, and the soil all round them was impregnated with foul matter. The rain-water pipes were all connected directly to the drain, and four of them had their open ends just below and about six inches from where the school windows opened to admit fresh air, there being no special means of ventilation provided.

The drains in two cases were taken for a considerable distance under the school-rooms. The pipes in these two cases were simply laid loosely on the ground under the floor, and were not jointed. Some of these pipes were broken. The whole of the surface drains in the school playground were untrapped, and instead of gulleys there were large, square, rubble-walled holes, partly filled with filth. There was an open drain in the heating vault which might have served as a conductor of sewer gas, but fortunately, or unfortunately, the builder had got his main drain too high to take this branch drain, and as a way out of the difficulty he laid it a few feet from the building and left it to discharge into the soil to find an outlet for itself. Most of the junctions between the branch and main drains were made by breaking a hole into the latter.

The next diagram shows the drainage of local board offices premises built in 1882. The drains were all untrapped, a six-inch pipe was joined to a twelve-inch pipe by being merely stuck into it, and, most extraordinary of all, the sewage made up partly of drainage from a public urinal discharged into the soil against a wall in the yard; that is, there was no outlet to the drain, and the sewage never left the premises, but sewage-logged the soil of the yard.

When I see men who are quite ignorant of the principles of drainage digging a trench for a house drain, I cannot help feeling "creepy," as it reminds me of digging a grave for people that are alive and well in the house.

It may be necessary to remind you that the illustrations I show you are not fanciful sketches of what Mr. Punch would call Prehistoric Peeps, but faithful representations of present day, so called, sanitary work.

Making full allowance for the necessity under certain conditions of more or less elasticity in enforcing sanitary regulations, I am sure every one who takes an interest in public health work will agree that the present want of thoroughness in sanitary work is not consistent with getting the best results. (The diagrams in supplement are given as examples of the admirable series of photographs shown by Dr. Hunter.)

A discussion followed, in which the President, Drs. Buchanan, Kaye, Cameron, Bond, and Johnstone took part.

Previous to the meeting, the Mayor (Councillor G. A. Moorhouse) entertained the members to luncheon, and extended to them a hearty welcome to Wakefield.

The meeting closed with a vote of thanks to the Mayor for his hospitality and for granting the use of the room for holding the meeting.

PROCEEDINGS OF THE BIRMINGHAM AND MIDLAND BRANCH OF THE INCORPORATED SOCIETY OF MEDICAL OFFICERS OF HEALTH.

A MEETING of this branch was held at Nottingham on July 12th. The members assembled at the Guildhall at half-past eleven, and, under the guidance of Dr. Boobbyer, visited the Health Depot of the Corporation and the subway of the new street. They then proceeded to the infectious hospital at Bagthorpe, where lunch was provided, under the genial presidency of Alderman Blackburn. On their return to Nottingham a meeting was held in the Grand Jury Room of the Guildhall, when there were present the following members: Drs. Boobbyer (president), Alfred Hill, Bostock Hill, Meredith Richards, Wilson, Millard, Tew, Priestley, Reid, Taylor, and Manley.

The minutes of the last meeting were read and confirmed.

The following elections to the branch were made; Dr. John T. Wilson, Shrewsbury; Dr. C. Killick Millard, Shrewsbury; Dr. S. Browne, Warwick; and Dr. Turner, of Leicester.

A letter was read from the Secretary of the Society of Medical Officers of Health containing a resolution passed by the Northern Branch on the necessity for further legislation for suppressing medical practice by unqualified men. It was resolved that, as this question is now being dealt with by the Parliamentary Bills Committee of the British Medical Association, the letter do lie on the table.

The Secretary then called attention to the proposed alteration in the articles of association, and to the action taken by the branch in January last with regard to them, and more especially to the attendance of branch representatives in Manchester and London. He congratulated the branch that discussion in the Council upon so delicate a matter had been carried through with the best of feeling upon both sides. It was then resolved that this branch cordially approves the proposed changes in the articles of association.

The following nominations were received: For president, Herbert Manley, M.B., M.A., D.P.H., West Bromwich; vice-presidents, Alfred Hill, M.D, Philip Boobbyer, M.D., and Henry May; treasurer, A. Bostock Hill; secretary, T. Ridley Bailey; council, Drs. Barwise, Fenton, Hollinshead, Reid, Priestley, Tew, and Underhill.

Dr. Reid and Dr. Bostock Hill were appointed to represent this branch at the meeting of the Sanitary Institute at Liverpool in September next.

The branch then elected as their representatives on the Council of the Society Drs. Reid, Bostock Hill, and Boobbyer, with directions to the secretary to do what might be necessary for their correct nomination.

Sewer Ventilation.

A discussion then took place upon sewer ventilation, introduced by Dr. Herbert Manley. Dr. Manley commenced by alluding to the frequency of complaints of the offensive odours arising from the sewer ventilators placed at the crown of the road, complaints which in towns immediately within his knowledge had been more than usually loud during the dry summer of 1893. He then alluded to the table of "Answers to Queries," published and collected by Mr. Earnshaw, the borough surveyor of Ashton-under-Lyne, from which he had drawn many of his statistics and which contained the experiences of eighty towns of some magnitude. Did sewers need ventilation? No doubt the answer would be in the affirmative, but Bristol, though completely sewered, possessed no ventilators, yet had no complaints of forced traps, and men could work in their sewers with impunity. Sewers, however, were supposed to need ventilation. In that case was the method of sewer grids at the crown of the road the best and least obnoxious way of ventilating them? Of the towns included in Mr. Earnshaw's tables who adopted this method by itself, 75 per cent. received numerous complaints of its results. These complaints were quite independent of the displacement of air by storm water, as they occurred also in towns where rain water was not admitted to the sewers, nor was the nuisance removed by charcoal trays and other similar efforts to deodorise these ventilators.

Another form of ventilation consisted in combining the sewer grids with a system of high ventilation, in which case the grids were said to become inlets instead of outlets for air. This certainly was not always the case. Property owners objected to the ventilators against their houses, while the retention of the grids did not obviate the nuisance arising from emanations. High ventilation pipes were said to require intercepting chambers as a *sine qua non*, and should be placed on the sewer side of such chambers, though such was not always the case. The consent of the property owner was now taken for granted in one western town, and the committee refused to pass any plan where interception chambers and ventilators were not provided, although it was extremely probable that in this instance they were acting absolutely *ultra vires*. Bournemouth also possessed a similar system, and was very free from sewer gas. Hastings and Scarborough discarded sewer grids, and used high ventilation only. Their sewers were reported safe for workmen, and complaints were unknown, a most important matter for fashionable watering places. Being towns of very different gradients it would appear fair to assume that there was not the necessity for crown-of-the-road grids which their advocates were in the habit of asserting. Why should such a form of ventilation be continued unless absolutely necessary? Other towns had difficulties which his hearers might explain. Not-

tingham endeavoured to obviate complaints by the erection of high ventilators in addition to their street gratings; Coventry relied upon rain-water spouts and factory chimneys, etc., etc. Was it not possible to arrive at the following conclusions: That the complaints of emanations were entirely due to the system of placing grids in the roadway; that this system was not an absolute necessity for sewer ventilation; and that systems of high ventilation were sufficient to keep sewer air without undue pressure. Allusion was also made to Holman's gas columns, Cainк's sewer gas filters, and a recent improvement upon Holman's patent by Deakin, of Birmingham.

Dr. BOOBBYER continued the discussion, and said with regard to Nottingham, which had been mentioned, high ventilators were erected on his recommendation, but he had little faith in their powers of ventilating a length of sewer; even when square and of considerable size, the anemometer failed to act after 12 feet above ground-level. Nottingham possessed gradients which obviated many complaints, but in his opinion a free outlet in the roadway was absolutely necessary to prevent over-pressure. He had known manhole lids to be forced off by the wind, and thought it likely that house-traps would be forced also. With regard to the emanations themselves, it had been shown by Mr. Parry Laws that sewer gas was innocuous as far as micro-organisms were concerned, but was only dangerous chemically; if this was true of London sewers it would apply anywhere. No high ventilation acted over any distance; *e.g.*, in Brighton, where furnace extraction was tried, there was no air movement in the sewer after the first quarter of a mile.

Dr. ALFRED HILL remarked that, as Dr. Boobbyer's last records proved, sewers not being air tight were never really unventilated. He was disappointed not to find any practical suggestion by Dr. Manley. A good gradient produced a perfect scour, and well-scoured sewers in which no deposit remained needed no ventilation. He did not believe in the principle that every house should contribute to the ventilation of the sewer, and so have to put up with their neighbours' stinks as well as their own. His experience of Holman's columns was that they were expensive without being efficient, while factory chimneys were limited in number and irregular in operation. Road ventilation had never been proved to produce zymotic disease, in spite of allegations to that effect, and many of the complaints were due to sentimental objections. The true cure was an improved form of sewer in which the sewage did not lie and generate gases, which, once generated, no system of ventilation could remove.

Dr. MAY concurred with the last speaker, and alluded to flushing as a valuable preventive. Much of the success of Bournemouth was due to their regular and efficient system of flushing with sea-water.

Dr. BOSTOCK HILL followed on the same lines, and said that the only true remedy in towns was flushing, and not ventilation. Sewers when first laid were too large for their requirements, and the mere trickle of sewage never scoured them; gas was produced, and an outcry leading to the use of high ventilators, in which he had no faith. He did not believe that sewer gas produced zymotic disease, though it was, no doubt, offensive. From the statements made by the promoters of patent ventilators it was clear that sewers were not airtight, while they proved a great deal too much. He did not believe that sewer gas could increase the luminosity of a gas jet, nor that a single gas lamp would influence the air over 450 yards of sewer.

Dr. MANLEY briefly replied to the effect that he was still of opinion that grids in the roadway were a nuisance and unnecessary; without being the cause of zymotic disease, they were quite capable of producing nausea and malaise. It was probable that the legal difficulties attending the erection of high ventilators would shortly receive attention, as the municipal engineers were working in that direction. Flushing was, no doubt, very good, but any large increase in the volume of water poured down our sewers meant increased trouble on the limited area of our sewage farms, and water was becoming more and more precious every year.

Dr. BOOBBYER gave an account of some cases illustrating the aërial convection of small-pox, and was followed by Dr. PRIESTLEY and Dr. MEREDITH RICHARDS.

PROCEEDINGS OF THE WEST OF ENGLAND AND SOUTH WALES BRANCH OF THE INCORPORATED SOCIETY OF MEDICAL OFFICERS OF HEALTH.

AT the last meeting of this branch the following paper was read :—

WHAT IS A DANGEROUS POTABLE WATER?

By F. W. STODDART, Public Analyst to the City of Bristol.

The question of sewage polluted drinking water —always of great importance—has lately assumed unusual prominence for two reasons—first the advent of cholera, secondly the publication of the report of the Royal Commission on the Metropolitan Water Supply. The former reminds us in the most forcible manner of the necessity for keeping a careful watch upon the water we drink; the latter professes amongst other matters to indicate the manner and direction in which that scrutiny may be most usefully directed.

I propose to confine my remarks entirely to the form of pollution known as sewage contamination, and to assume merely that the drinking of ordinary sewage is dangerous in the sense that specific infection may thereby be conveyed. The question whether or not danger is confined to one or two well-defined diseases I propose to leave untouched; though this is, I venture to think, a highly important matter worthy of more consideration than it generally receives. For instance it has lately been shown that constantly inhaling sewer gases produced a derangement of health in animals and rendered them very sensitive to the typhoid bacillus; is it not reasonable to suppose that constantly drinking sewage extract will have a similar effect? In fact, I think there is direct evidence that drinking sewage not only predisposes to specific disease, but even gives rise to definite disorders, not perhaps at present recognised as specific.

Now the admixture of sewage with water may and does take place under two very different sets of conditions; it may be directly discharged into a stream, well, or reservoir, or it may only reach the latter after percolation through soil.

The sewage as a whole undergoes very different changes according as one or other of these condi-

tions obtains, and it will be useful to look at them separately.

It is chiefly the first class of polluted water, as exemplified in the Thames, that the Royal Commission had to investigate, and it will be convenient to consider the evidence laid before them and the conclusions they deduced before passing to the second class, as to which they had little to say.

1. *Dilution* (Par. 149).—Now in the first case we have a simple dilution of the sewage with water presumably organically pure. How does this affect the question of infection? It is necessary to bear in mind that a typhoid or cholera stool is or may be a practically pure culture of specific organisms in a most active and vigorous condition, that on admixture with ordinary sewage such organisms multiply prodigiously, and that therefore the total sewage will, unless the physical conditions are too unfavourable, rapidly become strongly infected.

Can we then state a definite degree of dilution beyond which the mixture of water and sewage becomes a safe beverage.

The Royal Commissioners are apparently inclined to adopt this view, for they calculate that the maximum amount of infection possible under existing circumstances is in the Thames one case of typhoid to 294 million gallons, and in the Lea one case to 180 millions, and then proceed to suggest that this is a strong argument against the power of such water to convey infection.

Is there any valid reason for this assumption?

Many of us know the storage reservoirs at Barrow Gurney, from which much of the water is supplied to Bristol. The maximum capacity of these reservoirs is 750 million gallons. Would it be considered reasonable to assume that the dejecta of two and a-half typhoid patients—not single stools, remember—might be discharged into this body of water without risk to the population of Bristol?

Besides, how is one to ensure the complete admixture of the dejecta with the water. Just as a few hundred gallons of water from the reservoir might be enormously polluted as they enter the main, so may the pollution of a river like the Thames be strictly local, inasmuch as there is a very large business and pleasure traffic upon it, apart from the towns which drain into it. What is to prevent the discharge of fœcal matter right over the intake of a water company?

Moreover, the supposition that the cases of typhoid are uniformly distributed throughout the year is a clear indication of the failure of the Commissioners to grasp the situation.

Reference to any text book will show that about 50 per cent. of cases occur between August and November, when the proportion of cases will be increased from two to four times as compared with other months.

A good deal is made of the fact that much of the sewage is treated by irrigation before passing into the river. It is at least worth consideration whether in such case specific organisms have not a good opportunity of multiplying, and it is beyond dispute than in most, if not all, sewage farms much of the sewage escapes treatment altogether.

2. *Persistence* (Par. 150).—Then, in following the admittedly polluted water to its distribution, the Commissioners review certain considerations affecting the continuance of its infective powers; and, first, as to the persistence of specific organisms:—

> It must not be supposed (they say) that typhoid dejecta retain their infectiveness for an indefinite period. It appears to be the belief of bacteriologists that such dejecta begin to lose their virulence after a very few days, and the longest period for which the typhoid bacillus has as yet been found to retain its vitality when in fœcal matter does not exceed fifteen days.

Now here, and indeed throughout this paragraph, there is a manifest confusion between prolonged vitality and maintenance of pathogenic virulence, two very distinct and not improbably inversely varying properties; and it is more or less definitely assumed that if the bacilli have lost the power of giving rise to disease their presence may be ignored. Thus, the opening sentence reads:—

> That such an occurrence, *i.e.*, the carrying away of fœcal deposit by floods is possible, and, indeed, that it must occasionally happen is beyond question. There are, however, several important considerations on the other side which must be taken into account before it is concluded that such an occurrence would constitute any appreciable danger. In the first place, the quantity of typhoid matter which could thus be washed down must be excessively small; and still smaller the amount of this which will still have retained its power of setting up disease.

I should say that I can find nothing in the minutes of evidence to justify this confusion of two distinct factors; indeed, Professor Ray Lankester and Dr. Klein clearly suggest that virulence may materially alter whilst vitality is unimpaired, as has since been abundantly demonstrated with other organisms; and I think to accept the views of the Commission on this point would be to close our eyes to a very serious danger. For if the infective power be lost, but the vitality retained—that is if the bacilli assume a merely saprophytic character—there is the obvious and real danger that by an inverse process they may re-acquire pathogenic powers, and may spread disease possibly at first in a mild and unsuspected form, returning by degrees to their initial virulence as a result of their return to a suitable habitat. Such a change of powers has long been known in the case for instance of the chromogenic bacteria, and I have observed something similar with the typhoid organism.

The use of media containing antiseptics in the detection of this bacillus is well-known. Now I have found that with a medium of definite strength the success or non-success of an inoculation depends upon the age of the original culture. For

instance, a broth culture will remain capable of giving fresh cultures in ordinary broth for many months, but will not start a growth in the antiseptic medium if of greater age than about three weeks. If, however, it be first passed through ordinary broth, a culture in the antiseptic medium is obtained without difficulty. Here the bacillus soon loses some of its powers, possibly including its virulence, but is readily restored by a suitable environment. The danger of a succession of mild cases is obvious, and was indeed, I understand, a feature in the late small-pox epidemic in Bristol.

Whilst admitting that this early loss of virulence is a reasonable supposition, the means at our disposal for determining the activity of the typhoid bacillus in this direction are by no means of the most satisfactory character, and do not approach in definiteness those employed in the case of other organisms such as anthrax.

The question then resolves itself into one of continued vitality, and we naturally look for the authority for the very definite limit of 15 days already quoted.

The reference numbers in the margin of the report are those attached to two of Dr. Sims Woodhead's replies which form part of his examination as to the duration of vitality of the typhoid bacillus in water, sewage, and fœces. It would be impossible to represent the tenor of this evidence by quoting one or two replies, a d as the whole of this very important part of the report is based upon this evidence, I shall ask you to allow me to read it verbatim. Dr. Ogle is examining, and asks :—

13,096. Can you tell me how long the typhoid bacillus has been known to live in water?—It has been said to live for about 15 days, and even longer.

13,097. In ordinary water?—In ordinary water.

13,098. In river water?—Yes.

13,099. It has been said to live 15 days in ordinary river water?—About 15 days, yes.

13,100. I think in distilled water it has lived longer?—In distilled water it has lived longer.

13,101. But the question of distilled water does not touch us?—No.

13,102. But in river water it has lived for a fortnight or 15 days?—Yes. One does not carry all these things exactly in one's head. There have been a number of experiments on which I do not place the slightest reliance, in which it has been said that it lived longer.

13,103. But in the best experiments, those in which you should put yourself the most confidence, 15 days or thereabouts has been the extreme limit of its maintaining its life?—Yes.

13,104. And in water which is diluted with sewage it is even a shorter time?—A shorter time.

13,105. And in fœcal matter itself?—Probably shorter still.

13,106. Is it possible to lay down any period during which it would live if it was left in a mass of fœces?—I do not think it is at present.

13,107. But it is a very short time?—Probably a short time.

13,108. A time that would be measured probably by days you mean, I suppose?—Yes.

In the succeeding replies Dr. Woodhead goes on to say that his faith in the limit of fifteen days is shaken by his own observations in a case of typhoid-infected sewage.

I am unable to find the original authority for this limit of fifteen days, but Dr. Woodhead probably had in his mind the following passage from his most valuable little work "Bacteria and their Products" (p. 198).

It is a somewhat important fact that the typhoid bacilli may remain active for a considerable length of time in the stools, for the bacilli in fœces kept in a sterilised tube for 15 days remain alive at the end of that period, and vigorous cultivations could be made from such material.

How far this supports the finding of the Commission I leave you to judge.

Now the fact is that although this bacillus may be recognised with tolerable certainty in pure cultures, and in waters containing only the usual water bacteria, there is at the present moment no method in existence which will enable one to detect it with anything like certainty in the presence of numerous organisms constantly occurring in sewage.

Hence the statement that it has not been detected after so many days has only a negative value.

The following observation also suggests a possible source of error in the same direction.

On February 13th, 1894, 500 c.c. of good tap water, in which no organism can be confused with typhoid occurs, were placed in each of two sterilised bottles, A and B, and after sterilising at 100° C, both received 1 drop (1/30 c.c.) of a broth culture of typhoid.

Cultures were made from these at intervals, but towards the end of June it was noticed that growths were not obtained with certainty without vigorous shaking, and that this was especially the case with B. On July 12th cultures could still be obtained from A, but none of any kind from B after repeated and violent agitation. The water was then poured out of B, and a few c.c. of sterilised broth introduced, when an abundant development occurred of various forms, amongst which typhoid was readily detected.

Now, the only reasonable explanation appears to be that settlement of the organisms had taken place with the formation of a tenacious film, such as forms in a filter; and that the resistance of this film to shaking was increased by the presence of the water bacteria, so that finally it was impossible, with the utmost amount of agitation admissible in a plug-stoppered vessel, to detach organisms which, however, were very ready to develop in a suitable medium.

It is evident that no experiment on the persistence of vitality of any organism is conclusive which does not embrace the examination of the vessel as well as of the contained liquid, and that otherwise there is a danger of assuming the death of the organisms prematurely. Moreover, it is obvious that if the organisms had deposited on the muddy bottom of a stream, they would be liable to be carried off by a flood in an active condition.

In sterile waters and in sewage free waters the typhoid bacillus can certainly be detected several (five) months after inoculation, and may even

multiply in the meantime; and until we are in possession of a test that will enable us to positively ascertain its absence it will certainly be unsafe to accept fifteen days as the limit of vitality; and even if it be admitted that the pathogenic virulence is impaired, it does not follow that "it is only typhoid dejecta of very recent deposit from which danger is to be apprehended." Indeed, I suspect that a considerable body of evidence to the contrary could be gathered from a perusal of published reports upon outbreaks of enteric fever not arising from recent cases.

3. *Antagonism* (pp. 152 and 153).—The question of persistence is very closely connected with that of antagonism between organisms in the same medium, as to which the report states, and states correctly, that:—

> It appears to be the generally accepted doctrine of bacteriologists that the pathogenic organisms and the ordinary river bacteria to which the decomposition of organic matter is due are naturally antagonistic, and that these latter undoubtedly exert an influence in diminishing the vitality of the typhoid bacillus.

Now the evidence upon which this widely-accepted doctrine is based is really the weakest kind of negative evidence, whatever positive evidence has been adduced being in flat contradiction to it.

The arguments in favour of this view are, I think, chiefly these:—

(*a*) Antagonism has been proved to exist between certain micro-organisms, *e.g.*, prodigiosus and cholera, anthrax and Friedländer's pneumococcus, etc.

(*b*) Experimenters mostly agree that the bacilli of typhoid can be found at a much later date in sterilised water and sewage than in unsterilised.

On the other hand direct experiments have been made with the commonest water organism — the bacillus fluorescens—and it has been distinctly shown that it has no prejudicial action upon typhoid (Ray Lankester) or anthrax (Marshall Ward).

And it is becoming more apparent every day that special methods must be devised for separating each species in mixed cultures. This has been done more or less completely with cholera, but even there Gruber has shown that cholera may be temporarily overwhelmed by putrefactive organisms, and yet may be detectable months later when the latter have died out. Dr. Percy Frankland has shown of so well marked a species as anthrax that a culture may be so modified as not to give rise to growth when inoculated into broth, nor even to cause anthrax symptoms in an animal, and yet may be revived by the direct addition of nutritive matter so as to give both results.

No such successful method has been invented for typhoid, that recommended by Parietti and in best repute just now, not only failing to isolate the bacillus, but actually suppressing it when present. I have been for the last two years in search of such a method, and have now some hopes of success.

Lastly, sufficient attention has not always been paid to chemical alterations brought about by the process of sterilisation.

We shall see that light is practically inoperative except in the presence of abundance of oxygen. Sterlisation by heat, of course, goes far to remove this gas, and it is possible that filtration under diminished pressure may act in the same direction; hence experiments not carried out in complete darkness may be invalidated in this way.

Considerations of this kind should make us very cautious in accepting unreservedly any of the definite statements that have been made on the limits of vitality of the typhoid bacillus in the presence of other organisms.

4. *Action of Light* (p. 153).—We next turn to the action of light on micro-organisms referred to in the next paragraph of the report in the following terms:—

> In the case of these deep wells there is moreover another condition, wanting in the rivers, that is favourable to the development of the pathogenic bacteria being one of the conditions under which they grow in their natural habitat in the alimentary canal, namely darkness. For it is found that while exposure to direct sunlight destroys these bacteria, even such a tempered amount of light as is present under ordinary conditions in Thames water injuriously affects their vitality.

Now this is certainly going further than the evidence justifies. This paragraph is based upon Dr. Sims Woodhead's replies Nos. 13,121-3, which are as follows:—

> 13,121. What are the conditions that would interfere with their maintaining their vitality? One of the conditions is the action of light in clear water; of course not acting nearly so well in muddy water, or at some little distance away from the surface.
>
> 13,122. You mean in such water as the Thames water would be. You call that clear water do you not? Comparatively clear water.
>
> 13,123. The ordinary condition of the Thames and the ordinary condition of the light would be such as to affect the vitality of the bacillus? Certainly to some extent, in the superficial layers of water.

Then the Commissioners proceed to quote the preliminary statement by Dr. Woodhead, "that in the laboratory we are compelled to keep all our pure cultures which are under favourable conditions of growth, in a dark cupboard; otherwise they would die out, rapidly becoming weaker and weaker. The same, of course, must be the case where as in water under the open air organisms are exposed to light"; but actually omit the latter half of the last sentence, which reads "though the power that water, even apparently clear water, has of cutting off a large proportion of the active light must here be carefully borne in mind in considering this question."

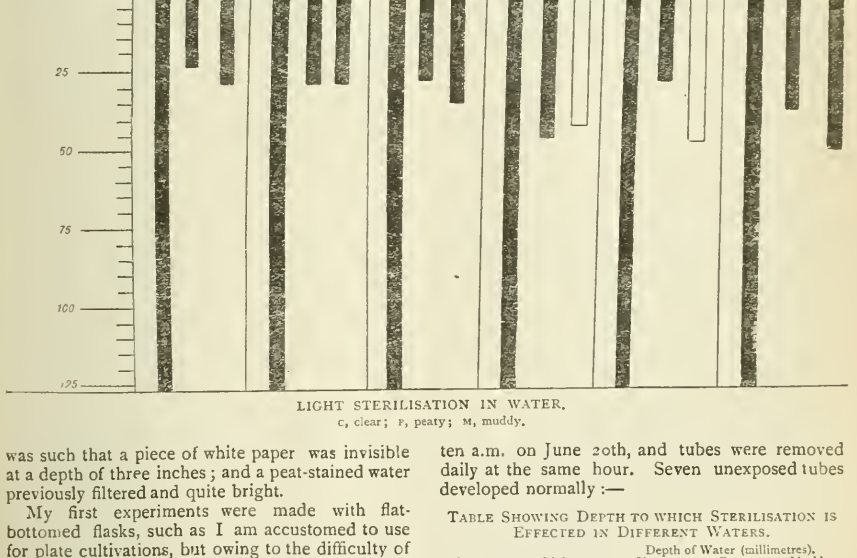
Moreover, no mention is made of the absolute necessity of an abundance of oxygen in this mode of sterilisation.

Whilst this action of light and oxygen had been thoroughly investigated as long ago as 1877 by

Messrs. Downes and Blunt, at the time of the report there had been no exact experiments bearing upon the effect of interposing a layer of water; and as some later researches are extremely contradictory I have attempted during the past six months to arrive at some definite conclusion, and though much interrupted by unfavourable weather have obtained some results of interest.

The problem is to find in what way the action of light is modified by the interposition of a layer of water of varying character and depth, and it is not sufficient therefore to diffuse the organisms through the water, but it is necessary to define their exact distance from the surface.

Three waters were employed in these experiments; a bright, practically colourless water; muddy water from the Avon, the opacity of which



LIGHT STERILISATION IN WATER.
C, clear; P, peaty; M, muddy.

was such that a piece of white paper was invisible at a depth of three inches; and a peat-stained water previously filtered and quite bright.

My first experiments were made with flat-bottomed flasks, such as I am accustomed to use for plate cultivations, but owing to the difficulty of securing the necks of the flasks I was only partially successful, though I found that flasks at a depth not exceeding two inches in the Avon water were sterilised in a fortnight.

I then enclosed broth in flat glass tubes, which were inoculated with typhoid and sealed before the blow-pipe. Of these tubes some were placed in water at depths varying from half an inch to six inches, others were kept in the dark, and others exposed in a south window. None of these were affected in a week by the light in the least, all giving an abundant growth of typhoid.

As the week in question was a bright one, with plenty of sunshine, the only likely explanation of this failure was want of oxygen.

In order, therefore, to correct this deficiency, and at the same time to form a more correct idea of the progress of sterilisation, I finally adopted the following course. Tubes of about 1¼ inch diameter were charged with the least possible quantity of agar-gelatine medium, sterilised by heat, inoculated with typhoid, and sealed with the blow-pipe. They were then placed obliquely in the tanks, so that the portion covered with medium was uppermost, and at a depth from the surface of the water varying from ·25 m.m. to 125 m.m. (1—5 inches). The three series were started at ten a.m. on June 20th, and tubes were removed daily at the same hour. Seven unexposed tubes developed normally :—

TABLE SHOWING DEPTH TO WHICH STERILISATION IS EFFECTED IN DIFFERENT WATERS.

Exposure Days.	Light Record.	Depth of Water (millimetres). Clear Water.	Peat Water.	Muddy Water.
1	3,726	125	25	30
2	7,355	,,	30	30
3	4,060	,,	30	35
4	4,690	,,	45*	—
5	4,540	,,	30	—
6	3,550	,,	—	—
7	4,056	,,	40	50

* This tube became detached, and floating too near the surface was apparently sterilised to a greater depth than was actually the case.

The table shown summarises the results, the value of which is greatly enhanced by the addition of a record of the actinic power of the light day by day. These data were most kindly furnished me by Dr. Richardson and Mr. Quick, of University College, by whose chlorine actinometer they were obtained. This instrument is described in the *Philosophical Magazine*, 1891, p. 277. I am further much indebted to Dr. Richardson for many valuable suggestions.

It will be seen that complete sterilisation took place in air and in clear water within twenty-four hours, but that no sterilisation took place in the other waters at a greater depth than 50 m.m. (2 inches) even at the end of a week.

It now became desirable to repeat the experiment with clear water to ascertain how rapidly sterilisation proceeds, and if clear water retards at all.

Tubes similar to the above, therefore, were placed horizontally at the bottom of a tank and covered with 250 m.m. (10 inches) of bright water, another series being placed in air. Exposure took place on July 1st, tubes being removed hourly from 10 a.m. to 6 p.m., all the tubes being in brilliant sunshine all the time. The results were as follows :—

	Light Record.	Air.	Water.
10—11	629·5	Growth	Growth.
10—12	648·3	Sterile	Slight growth in thickest part.
10— 1	686·1	Sterile	Sterile.

All subsequent tubes sterile. Four additional tubes kept in the dark developed normally.

Having now ascertained the range of action of sunlight for these waters I returned to the flasks which give more striking pictures, and emphasised any effect by Buchner's method of painting an opaque design upon the exposed surface. These cultures, which were exposed from ten a.m. to six p.m. on a bright day at a depth of 50 mm. (2 inches) from the surface, I now produce, and it will be seen that no sterilisation took place in the case of the peaty and muddy waters, but that the culture was entirely sterilised in clear water, except where protected from the light.

To complete this part of the research experiments were then carried out in a fairly clear natural water, representing more nearly a river water such as might be used for a water supply. This water completely obscures a piece of white paper at a depth of 2 feet 6 inches. Flat-bottomed flasks were sunk in this water at depths ranging from one to four feet, and exposed for a week : the first flask was plainly visible at a depth of 1 foot; none of the others could be seen.

The light record for this week was 36,462 units, and the temperature of the water on the last day 17·4° C. On examination it was found that normal development had taken place in all the flasks except that nearest the surface, and in this no growth resulted on incubation.

I gather from these experiments that sterilisation by light in presence of abundant oxygen fails in a simply turbid water at a point somewhat nearer the surface than that at which a white paper ceases to be visible.

For instance, on June 17th the water of the Severn at the intake of the pumping station (then in action) of a certain important town was such that a piece of white paper was invisible at a depth of 23 inches. Any pathogenic organisms at the orifice, which is considerably deeper than this, would be unaffected by light. The medical officer of this town, in his annual report for 1893, says :—

> I regret to have to announce that since the Severn water has had to be used, a large increase has taken place in the number of typhoid fever cases notified in this city. I do not pretend to say positively that the Severn water is the cause, but I can find no other explanation for it, and I am informed that this disease is prevalent in towns further up the river, and which drain their sewage into it.

It will be noticed that in all these later experiments by far the greater portion of the vessels used was filled with air. Now this is a point of the utmost importance, and I am endeavouring to ascertain the minimum of oxygen necessary to effect sterilisation.

I have found that a tube two-thirds full of broth and stopped with a cotton plug can be exposed for a whole day to bright sunshine without any evidence of sterilisation.

Now the saturation quantity of oxygen for water at the ordinary temperature is about 2 cubic inches per gallon, or ·75 per cent. by volume, corresponding to 3·75 or, say, 4 per cent. of air.

If, then, 33 per cent. of air is insufficient, it appears that in a river the great bulk of water can never be sterilised at all. Of course, I am aware that this portion of the argument is at present very incomplete, but as far as my investigation has gone, and especially bearing in mind that organisms are destroyed by light with more difficulty in water than in culture media, I think I am justified in saying that in natural waters sterilisation by light is so imperfect that it should not be relied upon as a protection against infection. It should be borne in mind that all these results were obtained in exceptionally brilliant weather, and that the cultures were fully exposed to the sun during the whole time.

5. *Settlement* (p. 153).—Settlement of bacteria whether alone or with particles of suspended matter has an important temporary effect, but in referring to the experimental evidence on this head the Commissioners forget to add to the statement that 98 per cent. of the contained organisms settled down with mud, the further statement that the organisms may be re-distributed throughout the water within 24 hours, and that Dr. Percy Frankland, by whom this part of our subject has been chiefly investigated, expressly states that this form of purification is not

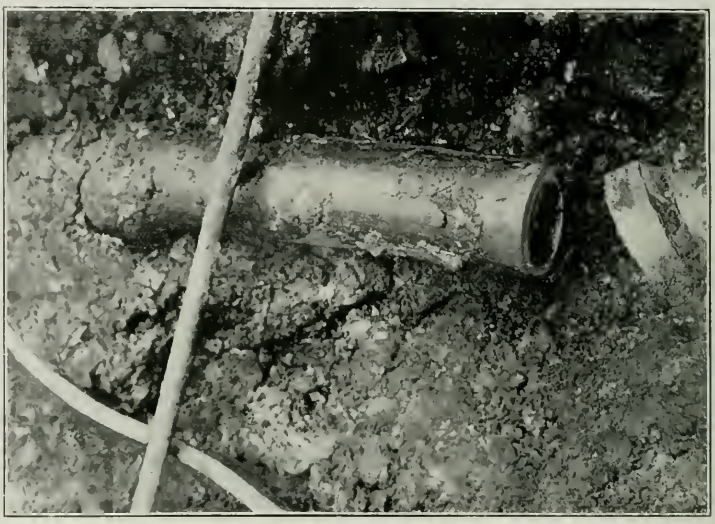


FIG. 1.—HOUSE DRAINAGE.

"Junction" between 6-inch drain pipes, about 4 feet rom gully near wall of house. There was almost always illness in the house. Forty-one buckets of stinking sewage sludge were fouod under the cellar floor. This work was done in 1890.

FIG. 2.—DRAINAGE OF INFECTIOUS DISEASES HOSPITAL.

Built in 1891. Defective connection between soil pipe and drain; irregular gradient and line of drain; also loose joints. The drain was choked, and a quantity of sewage had accumulated round the pipes.

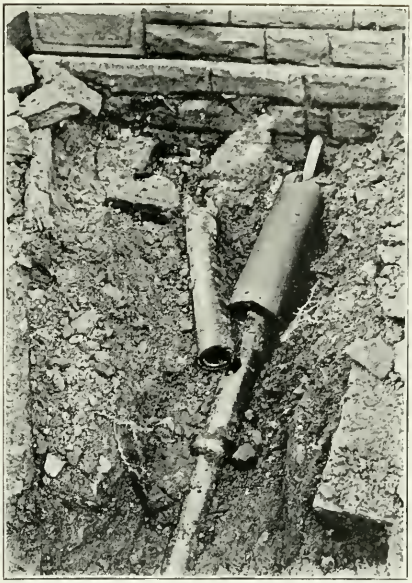


FIG. 3.—PATCHWORK DRAINAGE OF £50 HOUSE.

Fall pipe disconnected about 3 feet above ground level. Irregular leaking catch-pit to receive the yard surface water and roof water. Sink pipe joined to piece of 6-inch pipe without collar. The 6-inch pipe placed loosely against a 3-inch pipe, into which a hole had been broken to receive the roof and surface water, which came through a 4-inch pipe.

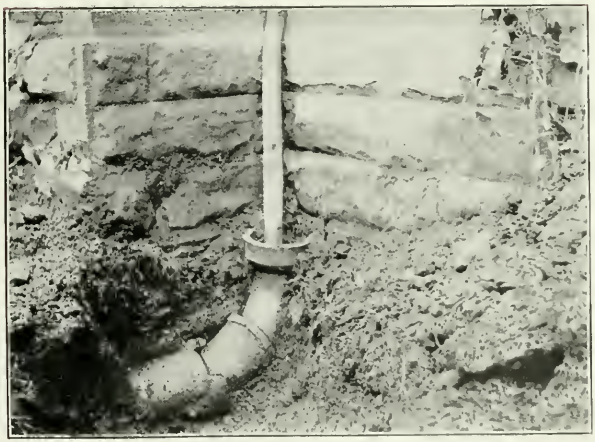


FIG. 4.—HOUSE DRAINAGE—LARGE MANSION.

Flower-pot used as a diminishing-pipe.

to be relied upon. Indeed, it is open to doubt whether the removal of bacteria from the influence of light and air, and their storage in a position from which they will be removed by every flood is any advantage.

6. *Dose of Organisms* (p. 158).—I need only briefly refer to the paragraph in which the dose of bacilli necessary to set up disease is discussed. In the present state of our knowledge any proposal to establish a numerical maximum of pathogenic organisms which may be permitted in a potable water will not, I am sure, meet with the approval of this meeting. Besides there is nothing in the evidence to support this. On the contrary, all the witnesses disclaimed any knowledge of the quantity of typhoid bacilli necessary to set up disease.

It would appear then that there are no sufficient grounds for assuming that the raw water of any stream into which sewage is discharged is a safe supply for drinking purposes; is the position improved by filtration?

7. *Filtration* (p. 154-6). — Now it has been placed beyond doubt that simple sand filtration in its most perfect form will remove a very remarkably large proportion, often exceeding 99 per cent., of the micro-organisms of all kinds present in water, and this has naturally been advanced as a proof of the safeguard afforded by this process.

It must not be forgotten, however, that the small residual fraction represents no inconsiderable number of organisms. Dr. Percy Frankland puts the average number of residual organisms in the filtered Thames water from the mains at 400 per c.c., or four times the maximum suggested as admissible in a filtered supply; and though this number is probably greater than exists in the water immediately after leaving the filter, it detracts to my mind considerably from the sense of security afforded by a contemplation of the percentage reduction.

A more serious consideration, however, is the certainty of occasional failure where such immense filtering areas are employed.

The well-known breakdown of the Altona beds, and the consequent outbreak of cholera, proves the reality of this danger.

If this could occur during the comparatively short epidemic, is it not likely that it would occur pretty frequently in ordinary practice?

Indeed, an inspection of Dr. Frankland's monthly reports shows pretty plainly that this does occur, and that the variation in the number of organisms passing the filters of the London companies is very considerable. Thus in November and December, 1886, we find the following figures:—

	November.	December.
Thames	... 56,000	 63,000
Chelsea	... 65	 222
West Middlesex ...	... 47	 2,000
Southwark ...	... 321	 1,100
Grand Junction ...	... 80	 1,700
Lambeth	... 108	 305

Here, although the initial proportion of organisms is not very different, the number passing the filters is from three to forty times as great in December as in November. This was not improbably the effect of frost; but the fact that 3 per cent. of the organisms can penetrate through the filter is quite a serious matter; in short, a too implicit reliance on this mode of purification may well be a source of danger in the future, as it certainly has been on more than one occasion in the past. Dr. Klein, after pointing out that no kind of filter, not even excepting the porcelain cylinder, is continuously germ proof, sums up the matter in these words: "No filtration is reliable to do away with all risks," and repeatedly emphasises this point in his replies (10,942-5, 10,953, 10,983, etc.)

8. *Analysis* (p. 141).—What in the next place are the means available for detecting this form of pollution?

There are two main methods of ascertaining the admixture of sewage with natural waters, the chemical or biological examination of samples, and local inspection.

Under the circumstances we are now considering chemical examination is placed at a great disadvantage, as will be seen on looking at the quantitative effect of dilution on the characteristic constituents of sewage. Take albuminoid ammonia for instance—a grain per gallon would be a very full average. Dilution of the sewage with about 250 times its bulk of pure water would reduce the albuminoid ammonia beyond significance. Other constituents such as chlorine, which may be put at 10 grains, would even more rapidly lose their value as sewage indications. Except then in the shape of series of analyses along the course of a stream, useful information is not often obtainable by the chemical analysis of the water of rivers, especially if of large size, though of course results pointing to contamination, if such are obtained, are all the more significant.

The Commissioners, however, take another view of water analysis of an altogether extraordinary kind. They appear to regard the quantitative estimations comprised under the name of water analysis as being intended to determine the quantity of organic matter present, and then argue that the days of water analysis are departed, because this organic matter may be harmless, and refer to the substitution of a "better test," apparently of a biological kind. It will scarcely be necessary to point out that all this is entirely erroneous, the sole object of the quantitative estimations being to ascertain the quality and source of the polluting matter, quantity being a very secondary consideration.

The biological tests are at the present time scarcely as decisive in results as the chemical, though I hope shortly to show that useful information may be obtained by a modified method.

Local inspection then remains the most useful

proceeding with this class of water, for in the great majority of cases direct pollution with sewage must be capable of demonstration.

Having then dismissed chemical evidence as out of date, and biological tests as still in their infancy; having, in short, characterised the one as senile and the other as puerile, the Commissioners turn with evident relief to the teaching of experience, and this they take under two heads, the effect of the present supply on the health of London, and general evidence as to the conveyance of disease by river water.

On the first question the Commissioners come, as on the evidence they were bound to come, to the conclusion that in no single instance has the consumption of this water been proved to cause disease; and as the conditions have remained practically unchanged for thirty years this is no doubt a very strong piece of negative evidence.

On the other hand, two very experienced observers, Drs. Frankland (4,575) and Woodhead (13,080) flatly decline to endorse the conclusion that typhoid is not and cannot be disseminated by the use of this water, and the latter states (13,091) that he would not drink any London water without first treating it by a process which would ensure sterilisation.

On the second head the Commissioners declare themselves unable to accept the conclusions of Dr. Barry as to the Tees Valley epidemics, the only instance of alleged conveyance of disease by river water of which they take notice; and they were evidently influenced in this by the consideration of dilution, a point already dealt with.

It is curious that just about this time a clearly demonstrated case of river-borne typhoid occurred at Lawrence, in the United States, and another at Chester-le-Street, in Durham, the water having been filtered in both cases.

Two other instances were brought before the Commission, one by Dr. Turner (4,725) relating to the Lea, and another by Dr. Seaton, who proved completely to his satisfaction that typhoid was conveyed from Godalming down the River Wey for upwards of a mile. Both were apparently ignored by the Commissioners, who make no mention of them in the report.

Let us then pass to the second form of pollution, namely, that where the sewage is not directly discharged into the water, but slowly percolates through the interstices of the soil, only gradually mixing with the subsoil water.

Here there exists an entirely different state of things.

We shall have the centre of pollution—say, a cesspit—situated within an area of more or less elliptical shape, its long axis in the direction of natural drainage, and elongated in proportion to the rate of flow. Over this area we shall get a mixture of sewage and water in proportions varying with the distance from the source of pollution.

With reference to the ground already covered, I need only say that the absence of light, the comparatively uniform temperature, and the gradual dilution are all probably favourable to the persistence of pathogenic forms.

But the special features of the case under notice need some attention. And of these the most important is the question of natural filtration.

It is often tacitly assumed that the subsoil is a thoroughly effective filter, and that evidence of percolation sufficient to remove the grosser matters is evidence of satisfactory purification. In taking this view it is overlooked that there is little or nothing in common between the action of the sand filter and that of the subsoil in effecting the purification of water. The sand filter in its most perfect form produces no chemical improvement in the water, but solely by mechanical action removes suspended matter, including microbes. Its efficiency therefore depends upon the perfection of the mechanical arrangements, of which the most important are the following: (1) A certain fineness of material; (2) sufficient depth; (3) uniformity of particles of filtering medium; (4) regulated rate of flow; (5) protection against accidental disturbance; (6) renewal of material when necessary.

Now the subsoil does not comply with any one of these conditions; indeed, water does not commonly pass through material of which it is composed unless this is gravel or sand, but along the partings and fissures; and whatever path it takes it naturally enlarges day by day by solution or disintegration, or both, so that to get the same amount of surface contact an enormously greater thickness of filter bed is required. The rate of flow, so far from being adjusted to the filter, is at the mercy of numberless accidents quite beyond control. But the very circumstances which prevent the subsoil from being an efficient mechanical filter add to its power of dealing biologically with the unorganised matter of sewage; for the opening up of the subsoil furthers its aëration, and so supplies one of the essential conditions for the vigorous action of the nitrifying organisms.

But the fact that the chemical constituents of sewage are so broken down by microbic action that the originally offensive compounds are resolved into inoffensive salts is no kind of guarantee that living pathogenic organisms are removed; indeed, many of these latter actually take part in this very process, and I found last year in connection with this subject that the cholera spirillum was apparently unaffected by the presence of these useful organisms.

There being, then, no necessary parallelism between the series of processes known as nitrification, and the elimination of pathogenic organisms, it is impossible to fix upon any stage of the former as that at which danger ceases.

It is quite possible that the danger of infection

may survive the chemical evidence of pollution, and I think decidedly that the only safe course is to discard water in which there is clear chemical evidence of the presence of sewage products.

I have shown elsewhere that nitrification is often completed within three yards of the source of pollution, but that at a distance of 100 feet and upwards the chemical evidence of pollution begins to lose its force, though, of course, these measurements may vary considerably according to circumstances.

This brings us to the means of detecting this form of pollution.

Thanks to the fixation of practically all the nitrogen of the sewage, and the delicate tests we possess for the nitrogen acids, we are able to be much more precise in detecting sewage in this shape; here, indeed, chemical evidence is not only useful but indispensable.

For inspection is in many cases worse than useless, it is misleading.

Of this I could give numerous instances, but will content myself with reminding you of the frequency with which remnants of old and forgotten drainage systems, often not entirely disconnected from more recent work, are found to be sources of pollution.

For arriving at the sanitary value of a well water, I repeat chemical analysis is by far the best guide, and though infection may theoretically be conveyed by an apparently pure water, I do not think this often happens; on the other hand, as the chemical indications disappear at about the distance experience has shown to imply sufficient natural filtration to afford a reasonable protection against infection, there is little likelihood of doing an injustice to wholesome water.

The reply, then, to the title of my paper should be somewhat as follows: A dangerous potable water is one into which sewage is known to be discharged, or which is shown by chemical analysis to contain sewage products; and though filtration, if perfectly carried out, is a considerable safeguard, it is no absolute protection, and is only to be considered a makeshift to be employed where unsatisfactory water must be used.

"STRANGLES" AND DIPHTHERIA.—In the case of two young men, at Minsterworth, who were notified as suffering from diphtheria, I ascertained that the one who first developed the disease had been taking care of a horse which had suffered from the "strangles," a form of affection which appears to be distinctly diphtheritic in type. He communicated the infection to his brother, who slept with him. Fortunately the equine and human patients all recovered. This is the only occasion in which I have had any reason to attribute the infection of diphtheria to one of the lower animals, though cases of derival from cats are on record.—*Annual Report, 1893, of Dr. F. T. Bond, Gloucestershire Combined District.*

PROCEEDINGS OF THE NORTHERN BRANCH OF THE INCORPORATED SOCIETY OF MEDICAL OFFICERS OF HEALTH.

A MEETING of this branch was held in the Mayor's Chamber, Town Hall, Durham, on June 29th. Present: Dr. H. E. Armstrong, president, in the chair; Drs. Hall, Turnbull, Wood, Hembrough, Jepson, Vann, Park, Stokoe, Gofton, Laurence, Eustace Hill, and G. R. Murray.

The PRESIDENT announced the death of Dr. T. Gibbon, of Seaham Harbour, a member of the Branch, and it was resolved that a vote of condolence be conveyed to Mrs. Gibbon in her bereavement.

Letters regretting inability to attend were read from Drs. F. W. Gibbon, Hepburn, and Walker.

A letter was read from the Secretary of the Sanitary Institute announcing that the annual congress of that Institute would be held in Liverpool on September 24th and following days, and asking the Branch to appoint two delegates.

It was resolved that the Vice-President (Dr. Hall) and the Hon. Secretary do attend the congress as representatives of the branch.

On the invitation of Dr. Gofton, it was resolved that the next meeting of the branch should be held at Tynemouth at the beginning of October.

The HON. SECRETARY reported that the President and himself had attended the meeting of the sub-committee composed of representatives of the Society and the branches, which was held in London in May, and announced the recommendations of the committee with regard to the various matters considered by them.

The HON. SECRETARY stated that he had received a letter from Dr. Mitchell, of Hebburn, who regretted that owing to serious illness he had been unable to prepare his paper on the "Relation of Ashpits to the incidence of Typhoid Fever."

The following gentlemen were elected members of the branch: J. Hague Clegg, M.R.C.S., M.O.H., Stockton; W. Dalziel, L.R.C.P., late M.O.H., South Shields; J. W. Hembrough, M.D., L.S.Sc, M.O.H., Northumberland C.C.; T. Livingstone, M.D., J.P., M.O.H., Weardale R.S.D.

Dr. ARMSTRONG introduced the question of granting certificates under the Customs and Inland Revenue Act respecting the sanitary fitness of houses, and stated that his action in declining to give a certificate had been complained of to the Town Council of Newcastle by the Newcastle Industrial Dwellings Company. The Council had referred the matter to the Sanitary Committee for report. A similar complaint had been made to his Sanitary Committee by a deputation from the Newcastle-upon-Tyne and District Property Owners' Association, headed by their chairman, who was also a member of the Sanitary Committee.

Dr. Wood of Sunderland; Dr. Stokoe, of Gateshead; Dr. Turnbull, of South Shields; and Dr. Gofton, of North Shields, all stated that a few applications had been made to them for certificates under the Act, but in no instance were the houses in a proper sanitary condition, and all had refused certificates.

Dr. C. S. Hall, of Carlisle, read the following paper:—

Observations and Suggestions as to the Treatment and Burial of the Dead.

By C. S. Hall, L.S.Sc., M.R.C.S., L.M., L.S.A., Vice-President Northern Counties Branch of the Incorporated Society of Medical Officers of Health; Medical Officer of Health, Carlisle Rural Sanitary Au hority.

It may possibly be thought by some that this subject scarcely comes within the limits of practical sanitary work, and that it hardly presents any field for profitable or useful investigation. It may be contended that at the closing scene of death, the efforts, alike of the physician and the sanitarian, are brought to an end. But such is not the case, for the practitioner of hygiene must still continue his work, and just as during life he continually strives to maintain health and to prevent all diseases, so when life is extinct there is important work to be done. He must take care that no infection is communicated by the dead, and that no harm is done by the noxious products caused by the decay and putrefaction of the body. To what extent diseases may be transmitted to the living by the dead is not yet determined. But there is no doubt whatever that infectious diseases, and those in which the germs of disease survive in and about the dead body, may be communicated to the living by the corpses of such as have died under these conditions, and it is most important to bear in mind that this dangerous risk may be and often is continued after the ordinary earth burial.

Apart, however, from these more specific and well defined perils, it may be taken for granted that decaying and putrefying animal matter, whether human or otherwise, must always be a source of danger to the living, and that this is true in varying degrees, whether such animal matter be left in the open air, or placed in water, or buried in the soil.

In this paper I purpose considering the manner of dealing with those who die, from the time of their death to the final disposition of the body. In the first part the ordinary or earth sepulture is chiefly considered. . . . Let us commence with the time of death. . . . The body should be washed with some disinfectant, for which purpose a diluted solution of chlorinated soda, an ounce to a pint of water, is very suitable. In cases of infectious disease it should be used very much stronger, about half of each. This preparation does not stain, and the smell is not objectionable, which is an advantage. The room, preferably a large and airy one, should be well ventilated and kept as cool as possible. This is mentioned, since it is a common practice to exclude fresh air as much as possible. Except in stormy weather, it is best to open windows freely at the top, and slightly at the bottom. In very hot weather it is better to close the windows while the sun is shining on them, and to have blocks of ice constantly in the room where the body is lying.

Conduct of Funerals.—It is always desirable that funerals should take place as early as possible. In some cases, especially when the death has been caused by fever, the body should be disposed of, either by burial or cremation, within forty-eight hours of death. If decomposition comes on rapidly, which may be detected by the appearances, and still more by the unpleasantness, it will be best to adopt the following plan: Procure some thick sheet wadding; that which is antiseptic and absorbent is the best, but the ordinary kind answers quite well. With a large and sharp pair of scissors cut long strips about four inches in breadth; sufficient must be cut to go all round the edge of the coffin; next sprinkle over the shroud and linings, and all about the inside of the coffin, some four or five pounds of fresh and dry chloride of lime. The wadding strips should then be placed smoothly and evenly all round the top edge of the coffin. This layer of wadding must be of uniform thickness, and free from lumps. The lid of the coffin should then be carefully put on, over the wadding, and screwed down. If this is properly done there will be no more disagreeable odour. These details may appear needless, but some of the most unpleasant, and I may say truthfully, some of the most painful and repulsive experiences I have ever had have been at funerals. Sometimes churches and cemetery chapels are filled with the most offensive and noxious gases, and persons are often made quite sick under these distressing circumstances. Not only is this dangerous to health, but it is a positive insult to the dead. If the living have any respect for the dead, it is their bounden duty to take care that no harm and no unpleasantness is permitted.

By the simple plan I have named, if carefully and intelligently done, the relatives and friends will be spared much humiliation, and a gross act of unkindness to the dead will be avoided. I have tried several disinfectants, but have found chloride of lime most effective for this purpose; it is necessary that it should be good and dry. It is desirable that the coffin should be made air-tight, as by being pitched inside, and that the lid should fit true and level with the top rim, otherwise there will be an offensive escape of gases. This should be named to the joiner when ordering the coffin. But in many cases, and especially in cold weather, it will be found that there is nothing objectionable even after several days.

With regard to the funeral service and the

ceremonies attending the same, customs differ most widely. In many cases a service is held in the house, usually in the same room as that in which the body is lying. It is evident that religious feeling and long established custom may commend this mode of procedure to those who prefer it; but in my opinion it is unwise and undesirable. In all cases of infectious disease it would be positively dangerous. Nor in my opinion should a dead body which has died of contagious disease be ever taken into any church or chapel.

There is another suggestion which may be safely urged, namely, that the open-air service should be as brief as possible, more especially in cold, wet, and stormy weather. Serious illness may be brought about in this way, the mourners usually standing bare-headed. At a time like this some of the mourners may be overcome with grief, and may also be fatigued and exhausted with nursing and anxious watching. Under these trying conditions, there is less staying power, and persons so exposed readily fall a prey to dangerous chills and various maladies. Important as this risk is, there is another, and as I believe an important one, which demands serious consideration. In our churchyards, cemeteries, and public burial places, immense numbers of dead bodies are continually being buried. In many cases, thousands of corpses in varying stages of putrescence and decomposition are lying some few feet from the surface. Above and beyond the gaseous emanations which make their way upwards from undisturbed ground, there is the additional risk arising from the constant opening up, or tapping, so to say, of these burial places by the continual digging of more graves in all parts of the grounds. I am quite prepared to admit that many of our modern cemeteries seem to be well kept; with their trees, shrubs, and ornamental headstones they present quite an attractive appearance to the eye. None the less, they are the silent cities of the dead, and only a few feet below lie the slowly decaying forms of multitudes of dead bodies. The numbers vary greatly in different places, but too often near great towns the crowding together of corpses is as unseemly as it is dangerous to health. I very much doubt if the general public has any idea of what actually takes place in some of the cemeteries near our great cities. At page 131 of a book by Mr. W. Robinson, is a picture giving a "Section of a London Cemetery." In this section fourteen coffins are shown lying one on the top of the other, so that the bottom coffin has no less than thirteen others resting upon it! It is this state of things which in my opinion must necessarily bring about a contamination of the atmosphere, rendering it a source of danger to those attending funerals. It might help to explain the unusual number of cases of illness and sometimes death which present themselves amongst those who have recently attended funerals.

At the risk of appearing to travel somewhat outside the margin of hygiene, let me venture to put in a plea for strictly private and quiet funerals. It may readily happen at such times as we are now considering, that grief and distress may be intensified by the ostentatious parade and the processional pageantry which too frequently attend our modern funerals. In many cases the large expense thus incurred must prove a most serious and depressing hardship.

Embalming.—Various plans have been adopted in the final disposal of the dead. Probably that now in general use is the most ancient. One of the most remarkable methods of dealing with corpses was that of embalming or "mummifying." The Egyptians attained a marvellous skill in this art. A public funeral procession and ceremonial was first held, and after that the body was then, in the case of males, at once handed over to the embalmers; but the bodies of females were retained until decomposition had set in. Herodotus, who visited Egypt, took great pains to acquire correct information about this singular subject. The process, which was very long, consisted in first removing all the internal organs of the body except the heart and kidneys. Most strange to say, the brain was drawn through the nose. The cavities were rinsed with palm wine, and filled with spices and preservatives. Next came a long process of salting, occupying some seventy days. The body was subsequently wrapped up in linen, cemented by gums and gum-resins. It was exceedingly costly. About £700, or more, was charged for first-class embalming; about £240 for the second-class; the third-class was intended for the poor, and cost very little. It consisted in salting the body for about seventy days, having first washed it in myrrh. At that time it was the fashion, and everyone was embalmed, but it is evident that the process, in its early stage at all events, must have been very obnoxious. If practised nowadays it would probably be regarded as an "offensive trade," and dealt with under section 112 of the Public Health Acts. None the less, Egyptian corpses, mummified by this process, are to be found in our museums, and even in private houses, which are as harmless, and as free from any unpleasantness as a piece of wood or stone, and may certainly be regarded as a marvellous triumph of antiseptic skill.

Risks of Earth Burial.—Returning to earth burial, the most serious risk is that large numbers of decaying bodies, some of which may have died of infectious diseases, will pollute the water. This has often been proved to have taken place. Again, the soil round the putrefying animal matter must necessarily become tainted, and germs of specific disease may thus, under favourable circumstances, thrive and multiply, and be brought to the surface by the digging of fresh graves, by currents of air, by the wafting of dust and germs, and, lastly, by the aid of worms. It is quite possible that foul and poison-

laden gases may slowly, but surely, make their way from the putrid animal matter to the surface. This may be facilitated by cracks and openings in the soil, caused by long drought, frost, or heavy rains. In fact, this is often proved to be so in some burial grounds by the noxious smells that arise from them.

Cremation.—We now come to consider a most important method of disposing of the dead body, which is alike of very ancient and also quite modern usage, namely, rapid burning, or, as it is commonly called, cremation. This is known to have been in use about 4,000 years ago. It was adopted both by the Greeks and Romans. Homer gives an account of it. It was very general about 3,000 years ago. It took place at the "Suttees," or burning of the widows of princes and distinguished persons in India. These widows voluntarily sacrificed themselves. It was abolished by the English Government in 1829, but it has taken place several times since. Several of the wives of Sir Jung Bahadoor, Minister of Nepaul, perished in this way so recently as the year 1877. It is interesting to observe that the Rev. Canon Greenwell found urns in the ancient British "Barrows." These were circular or oblong mounds used as sepulchres. The Canon presented some of these urns to the British Museum. His book, entitled "British Barrows," was published in 1877, and is well worth reading

I do not purpose going minutely into the history of cremation. Societies for the promotion of it were formed in London, Vienna, and Berlin in 1874. Mr. Justice Stephen gave his important decision on the law of cremation, showing that it was not illegal to burn human bodies, in his charge to the Grand Jury, at the Crown Court, Cardiff, in 1884, when dealing with a well-known case, namely, that in which Dr. Price had himself cremated or attempted to cremate his own child. The charge is a very long and learned one, dealing exhaustively with the whole subject. The full text may be found in Mr. W. Robinson's interesting book, already referred to, on "Cremation." (Cassell and Co., Limited. 1s.)

Sir Henry Thompson may certainly be regarded as the father of cremation in this country, and I have great pleasure in bearing testimony to the unflagging energy which he has for so many years brought to bear on this subject. His writings, letters, and lectures, together with his position as President of the Cremation Society of England, a position which he has held for twenty years, make him, as Sir Douglas Galston said in his valuable address, "The principal champion of cremation in this country."

It is somewhat strange that this method of disposing of the dead body, which was so general formerly and possessed so many recommendations, should have almost entirely fallen into disuse. It may be due in part to the want of suitable appliances to carry it out properly. Mr. Justice Stephen, however, in the learned charge before referred to, said: "There are no doubt religious considerations and feelings connected with this subject which everyone would wish to treat with respect and tenderness, and I suppose there is no doubt that, as a matter of historical fact, the disuse of burning bodies was due to the force of religious sentiments." The Judge afterwards goes on to say: "As for the public interest in the manner, burning on the one hand effectively prevents the bodies of the dead from poisoning the living; on the other, it might no doubt destroy the evidences of crime."

Considerable misconception exists as to the manner in which human remains are reduced to ashes by burning. Many mistakenly suppose that the body in its coffin is thrust into the midst of burning coals or fuel, and that it forms a part of the general burning mass, and is thus wholly consumed in a furnace. Such is not the case. The body and coffin are put into an empty chamber, and combustion is effected, not by contact with burning wood, coal, or fuel of any kind, but by the action of gases, heated up to an exceedingly high temperature, namely, about 1,800 to 2,000 $F^{ht.}$ There is no smell, noise, nor smoke, and the hall is so arranged that those present need not see or hear anything at all of the process of the crematory chamber. Owing to the enormous heat, the gases are given off without colour or smell. The residue or ashes remaining are passed into an urn by means of an asbestos brush; they are pure and white, and weigh on the average four or five pounds. What is left of the coffin can easily be distinguished from the human remains. The time occupied is usually about an hour, or an hour and a half.

The special advantages of this method are: First, that it is perfect, from a sanitary point of view. All risk of the spread of any disease, whether infectious or not, is entirely removed. All living organisms and germs, however tenacious of life they may have been, are then and there permanently destroyed. Second, it is rapid, complete, and wholesome, and cannot hurt others.

With regard to the general views that may be taken of burning the body, it appears to me more dignified, more highly civilized, and more respectful to the dead, than it is to dig a hole in the ground and bury the body in it, leaving it not merely to putrefy by slow degrees, but to become a fruitful source of danger to the living. A third important gain is that the actual and permanent identity of the remains is at once secured. If an indelible label be carefully secured, both inside and outside of the urn, there cannot be any mistake. It is usual to seal the contents in the presence of a witness as soon as they are removed from the crematorium. It is very different in ordinary burial places, for in these, only the approxi-

mate locality can be pointed out. It is a well known fact that in crowded places the coffins have often been destroyed and the bones removed in order to make way for others; so that the term "last resting place" is in such cases an utter delusion! There is another class of cases in which cremation tells favourably. Supposing anyone has died abroad; if the body be cremated, the ashes can, if desired, be brought to his or her native country. I don't attach any undue importance to this, but can readily understand that it might be very gratifying to some relatives and friends.

Objections to Cremation.—Let me now briefly consider some of the objections which have been raised against cremation. The first, and indeed the most important one, is that given by Mr. Justice Stephen, in his learned judgment, before referred to, in which he said that "it might destroy the evidences of crime." This, however, is undoubtedly due in a great measure to the defective state of our law in regard to the registration of deaths; it also applies with almost equal force to ordinary burials. This matter is now under the consideration of the Legislature. Sir Henry Thompson has dwelt very fully with this matter, both in his book on "Modern Cremation," and also in his letters to the *Times*; and in the *British Medical Journal*. In one of these he states that "The regulations of the Cremation Society have been carefully made, are rigidly carried out, and are in his opinion equal, if not superior, to any plan followed elsewhere."

There is another important and powerful objection which has been raised to the burning of the body, and it rests on the fact that the great bulk of the people regard the ordinary burial as more easy, quiet, and soothing; it is, they assert, more congenial to their feelings. It has been the custom, they say, for centuries, why change it now? If it was so perfect a method and so generally in use formerly, why was it given up? As a matter of fact people do not regard earth burial from a sanitary point of view, neither do they believe that it has hitherto done any harm or ever will. They become impatient alike of discussion and facts, and seem as if they would say: "Away with that odious red rag of domineering and tyrannous science, it spoils our peace and comfort." None the less, the hard unanswerable facts remain. Sanitarians must steadily and resolutely use their influence and raise their voices against even the most cherished and lasting of customs, in order that they may do good for the people at large.

Another class of objectors boldly urge the plea that cremation is opposed to religious teaching, and that it is unchristian. They even go so far as to say that it is opposed to the doctrine of resurrection.

The Rev. R. Ussher, of St. Albans, has written an excellent lecture on this subject, bearing especially on the doctrine of Resurrection and the disposal of the body; it is entitled, "Lecture on Cremation," and is published by the Cremation Society of England, at a mere nominal cost. There are two institutions in this country where this newer system of disposing of the dead is carried out. One is at Woking. The sum charged for cremation is £5.

A very well-appointed and most excellently managed crematorium is now established near Manchester, on the Barlow Moor Road, Chorlton-cum-Hardy, adjoining the Manchester Southern Cemetery, about four miles from the Town Hall. As at Woking, so here also, it is not expected or intended to make this crematorium a source of pecuniary profit; but the promoters naturally hope that it will gradually become self-supporting. The cremation fee at Manchester is five guineas; but there is a reduced scale of two guineas for the working classes. There is very little doubt that other large towns will soon do likewise, indeed, Liverpool already has the matter under practical consideration.

From the report of the Council of the Cremation Society of England for 1893, it will be seen that during the five years from the commencement of operations at Woking, that is from 1885 to 1889, both inclusive, the number of cremations was 100. In the four years from 1890 to 1893, both inclusive, there were 358. It is also noted that at the Manchester crematorium 3 bodies were cremated in 1892, and 30 in 1893, making a total in England of 107 in 1892, and 131 in 1893. The grand total was 591.

In the Père la Chaise Cemetery, in Paris, twenty to thirty cremations take place daily.

Hitherto the legislature of this country has opposed cremation; but the practice is not illegal, and it occupies at present the somewhat undesirable and anomalous position of being permissible, but not under State control. It is almost universally admitted that the law in relation to the registration of deaths stands in great need of speedy amendment, and that this is required both for ordinary burials and cremation. In the next place, cremation should be permitted only in such places as have been legally sanctioned, and should always be open to the inspection of duly appointed Government officials. It would also be desirable to empower sanitary authorities and County Councils to erect crematoria, when desired to do so by the majority of the ratepayers. Permissive legislation of this kind would enable cremation to be carried out where it was desired, but it would in no case be enforced against the wishes of any one. Although the number of those who approve of this practice is very rapidly increasing, the country is, at present, by no means prepared for compulsory cremation.

It is quite possible, that in small towns and country districts, urn burial may make but slow progress. But the case is wholly different in our

great cities and large towns. It is in these places more especially that the disposal of the dead is a subject which is being sternly forced upon the attention of the people. The time is evidently fast approaching when those who were the strongest opponents of cremation will be compelled, however reluctantly, to admit that it offers the wisest and safest solution of one of the most important and pressing problems of the day.

After some remarks by Dr. ARMSTRONG and HILL as to the advantages of cremation over the usual methods of disposal of the dead, a vote of thanks was passed to Dr. Hall for his paper.

PREVENTION OF PHTHISIS.

Dr. ARMSTRONG, in opening a discussion on "The Prevention of Phthisis," pointed out the infectious nature of this disease, and its great prevalence and mortality both among human beings and domestic animals. He thought the notification of phthisis was desirable, but that the time was not quite ripe for the compulsory notification of that disease. He also thought that the systematic disinfection of the discharges, clothing, etc., and bedding of phthisical patients should be carried out as much as possible, and concluded by moving the following resolutions:—

"1. That the Northern Branch of the Incorporated Society of Medical Officers of Health approve of the voluntary notification to the sanitary authority of human tuberculous phthisis, and the systematic disinfection of the discharges, bedding, clothing, and rooms in cases of that disease.

"2. That the branch are also in favour of the compulsory notification of tuberculosis in cattle; the compulsory slaughter of such cattle, with compensation to the owners; the destruction of the flesh and milk of such cattle, and the disinfection of cowsheds after the disease."

The branch recommend that the Society should specially urge medical officers of health to advise the adoption in their districts of the above named measures.

The discussion and consideration of the resolution was adjourned till the next meeting of the branch.

A vote of thanks was passed to Dr. Vann and to the Corporation of Durham for the use of the room, after which the meeting terminated.

CHOLERA PRECAUTIONS OF THE CHINESE.—During a cholera outbreak two years ago in Chin Kung, the furthest Treaty Port city up the Yang-tsze-Kiang river, placards were posted up, probably at the instigation of Taoist priests, urging on the people the necessity of cleansing their hearts, saying nothing about cleansing their houses. The same priests also sold charms against the disease, which, being put on board paper boats, were set adrift down the river and were supposed to carry the disease away to sea.

Public Health.

THE DEATH RETURNS OF HEALTH RESORTS.

WE have before us as we write the death returns of several health resorts. In each of these a death-rate is first given of from 13 to 16 per 1,000, then the deaths of all visitors who have not lived six months in the town are deducted, and a "corrected" death-rate is calculated, which comes out at the satisfactorily low rate of 10 to 13 per 1,000. Whatever may be said of this process, the result is doubtless satisfactory to the health officer who has made his calculation, and to the local authority and inhabitants of a given health resort, who are anxious that its exceptional salubrity should be noised abroad. But as we shall shortly see, the process is absolutely unsound, and the result must consequently be regarded as entirely untrustworthy.

A death-rate is compounded of two factors, deaths and population. If the deaths of visitors are to be excluded, the visitors among the population must also be excluded. The census is taken decennially in the month of April, and subsequent estimates are based on this. There is no separate enumeration of visitors, and their elimination from the population is impracticable. It is, therefore, not legitimate to omit the deaths of visitors from the death returns. It may be admitted that this slightly handicaps health resorts whose population is at a minimum in April, but it more nearly approaches the truth than the omission of deaths of visitors. Any slight disadvantage arising from the census-population not being a fair average of the population of a watering place, is more than counterbalanced by the excess of female domestics in all watering places at ages of low mortality. It is notorious, furthermore, that domestic servants do not usually die in the town in which they have worked, but are sent home when serious illness arises.

If we add to the previous considerations the fact that death returns for watering places seldom give the deaths of inhabitants occurring in public institutions without the boundary of the district, we have another reason for the profound distrust with which a death-rate of 10 to 13 per 1,000 is rightly received. The outlying institutions not only embrace in many instances the county lunatic asylum and the infectious diseases hospital, but also in not a few the workhouse infirmary. If the deaths in these institutions were included, and if the deaths of visitors were retained (failing a satisfactory separate enumeration of visitors) the death returns of watering places would receive more serious attention and credence.

THE CO-OPERATIVE TRIP TO BUDA PESTH.

THE following final particulars as to this trip are given for the convenience of those intending to visit Buda Pesth this summer. It is to be hoped that those intending to join the party will send in their names at an early date. A considerable number of medical officers of health and their wives have already signified their intention of travelling to Buda Pesth in connection with this party, and we may point out that the arrangements made in connection with it are much more economical than those otherwise possible, while the travellers will be saved all trouble as to travelling arrangements and hotels.

THE CO-OPERATIVE TOUR TO BUDA PESTH.
Conducted by Mr. Holdsworth Lunn.

Cologne, Frankfort, Nuremberg, Vienna, and Buda Pesth on the outward journey.

Vienna, Munich, Mayence, the Rhine, Bonn, and Brussels on the return.

Dr. Lunn has arranged for the convenience of medical men anxious to attend the International Congress of Hygiene and Demography at Buda Pesth with their wives and families for a twenty guinea co-operative tour. The route taken will be as follows:—

FIRST DAY.—Leave London, Monday, August 27th, viâ Dover and Ostend for Cologne, where the first night will be spent, and hotel accommodation provided.

SECOND DAY.—The morning will be spent in seeing Cologne, and, after lunch, the party will proceed by rail along the banks of the Rhine to Frankfort, where hotel accommodation will be provided.

THIRD DAY.—Frankfort will be left after lunch, Nuremberg being reached in time for dinner.

FOURTH DAY will be spent in Nuremberg.

FIFTH DAY.—Vienna will be reached, and hotel accommodation provided at either Hotel Continental, Grand, or Metropole.

SIXTH DAY.—The party will leave Vienna by rail after breakfast, and will reach Buda Pesth in time for lunch.

Five days will be spent in Buda Pesth, and accommodation provided at either of the following hotels: The Erzherzog Stephan, Europa, Hungaria, Jagerhorn, Metropole, National, or Pannonia. At the conclusion of the five days, members can prolong their stay indefinitely by making their own arrangements with the hotel proprietors, but the only conducted party will leave Buda Pesth on the sixth day after arrival for Vienna, where the remainder of this day will be spent. The next day will also be spent in Vienna, which will be left the following morning after breakfast for Munich, where that night and the following day will be spent. Munich will be left on the fifteenth day from the date of leaving London, for Mayence, which will be reached in the evening, and hotel accommodation provided at the Hotel d'Angleterre. The next day will be spent in Mayence, giving members an opportunity of a visit to Wiesbaden. The journey home would then be by way of the Rhine as far as Bonn, when the rail route will be retaken for Brussels, and a day's hotel accommodation provided at the Hotel de l'Univers. From Brussels members of the party will be able to proceed home when they desire.

In connection with the above a supplementary tour to Innsbruck from Munich has been planned. This will provide the railway tickets and three days' full hotel accommodation at the Hotel Europa and Goldene Sonne for the sum of three guineas extra.

Any who are anxious to join this party are requested to communicate with the Secretary, 5, Endsleigh Gardens, London, N.W., at once.

ANTITOXINS IN THE TREATMENT OF DIPHTHERIA.

THE increasing knowledge of the antitoxins of tetanus and diphtheria, brought about by the researches of Behring, Kitasato, and others, appears likely to have an important bearing on the treatment of these diseases. The observers mentioned above found in the blood serum of immune animals a substance which was able to confer a partial immunity against attack in other animals, and to arrest an attack already present. These facts have been applied with imperfect results in the treatment of tetanus, and they have been recently applied in the treatment of diphtheria.

Behring and Kitasato found that if the poison of a disease and the serum antitoxin were mixed in a test-tube in proper proportions, they neutralised each other, and the mixture subsequently injected into an animal was inert. Acting on these facts, Tizzoni and Cattani first produced immunity in goats by injecting graduated and increasing doses of boiled cultivations of diphtheria bacilli. They increased the degree of immunity thus produced by injecting gradually increased doses of virulent cultivations of diphtheria bacilli. From the goats thus treated serum containing large quantities of antitoxin was obtained. They then by experiments on guinea-pigs ascertained the dose of the antitoxin required to neutralise the toxin in cultivations of diphtheria bacilli.

The antitoxin has been used in the treatment of a number of cases of diphtheria in Berlin hospitals. It is premature as yet to speak of the numerical results, though they appear to be promising. Before using the material it was first ascertained that it was innocuous when injected into a healthy individual.

ON THE CORRECTION OF DEATH-RATES FOR TRADES.*

By J. Spottiswoode Cameron, M.D., B.Sc., M.O.H. for Leeds.

In the decennial report of the Registrar-General for the years 1871-81, Dr. Ogle made an attempt to ascertain the comparative mortality from certain trades. Selecting a hundred tolerably well-defined occupations, he had the deaths which occurred amongst men between the ages of 25 and 65 engaged in those trades got out, and he compared them with the numbers living at these ages and engaged in these occupations in the whole country. Taking the death-rate so found amongst the whole male population between 25 and 65 as 1,000, he found the corresponding rate amongst men of the same age engaged in every kind of occupation to be 967, whilst that of "unoccupied males," including, of course, men invalided by chronic disease, and those too weak to have ever been engaged in any active occupation, to be 2,182. On the other hand, selecting only the male inhabitants at these ages of certain healthy districts, he placed their mortality figure at 804. The corresponding figure amongst "occupied males" at the same ages in the hundred selected occupations varied from 556, the mortality figure corresponding to the occupation of "clergyman, priest, minister," to 2,205 the mortality figure for inn and hotel servants.

It will be at once evident that a town which contains a very much greater proportion of clergy, and a very much smaller proportion of inn servants than the country at large might (everything else being equal) be expected to have a lower mortality than one containing a very small number of clergymen and a very large number of hotel servants Any inference, however, drawn from such a circumstance might be untrue unless it took into account the relative proportion of the clergy and the inn servants in relation to that of the country as a whole, and also the comparative mortality figures for these two classes of persons.

A numerical example of the method adopted will serve as an explanation. Taking first the occupations just mentioned, in Leeds, according to the census of 1891, we had 0·898 ministers of religion (excluding church officers) for every 1,000 of the population. In England and Wales there were 1·446 per 1,000. We had therefore 0·548 per 1,000 fewer members of this longlived profession in Leeds than in the country at large. Assuming that the factor 556, given by Dr. Ogle as the comparative mortality figure for this profession at the ages of 25 to 65, held good through life, the recorded death-rate in Leeds would evidently have been actually higher than it ought to have been on account of the difference in the number of followers of this healthy occupation. Working this out it will be found that the death-rate of Leeds should be multiplied by the factor 0·9997567, to allow for this deficiency of clergy in our midst.

Again, there were in Leeds 553 men (or boys over 10) employed as inn servants, and 46,364 in England and Wales. These numbers correspond to 1·505 and 1,599 respectively per 1,000 of the total population, a deficit in Leeds of 0·094 per 1,000. As Dr. Ogle's comparative mortality figure was 2,205, Leeds gained slightly by having somewhat fewer persons engaged in this unhealthy occupation, and the observed deate-rate requires to be multiplied by 1·0001145. The result from these two occupations is therefore that for the clergy and innkeepers' servants alone, our recorded death-rate should be multiplied by 0·99987, which practically leaves the death-rate as it stands.

It will be at once seen that a difficulty arises if we neglect taking into account the women who act in the capacity of inn servants. In Leeds these numbered 473, nearly as many as the men for whom we have allowed, and when we compare the number of female inn servants in Leeds with those in England and Wales, we find that we have in Leeds 0·241 less, per 1,000 of the whole population, so occupied. Then comes the question, "Are we to add the minus quantity 0·241 to the minus quantity 0·094 already dealt with, or are we to neglect it?" If we neglect it, we evidently, in this particular trade, do not make full allowance for the absence of persons engaged in an unhealthy industry. On the other hand, as it is well known that one of the principal causes of the high death-rate amongst inn servants is intemperance, is it fair to assume that the high death-rate would hold to the same extent amongst women as amongst men? If we neglect the women the factor remains for the hotel servant as already given (1·0001145). If, however, we regard women as equally exposed to the risks of the trade with men, the recorded death-rate in Leeds would require for this trade alone to be multiplied by 1·0004.

But this question of the employment of women becomes important, if we take one of the principal industries of Leeds, that of the manufacture of woollen and worsted fabrics. At the time of the census, there were 6,081 male and 8,925 female persons engaged in the manufacture of woollen, worsted, and stuff, excluding wool staplers, dyers, and printers of wool and woollen fabrics, flannel and blanket manufacturers, fullers and dealers in wool and worsted goods. In England and Wales there were 102,050 male and 130,954 female persons engaged in the corresponding occupations, or nearly 41 per 1,000 of the population in Leeds, and about 8 per 1,000 in the whole country. Leeds had, therefore, an excess of 32·786 persons per 1,000 of the population engaged in this industry, In this case there seems no special reason for excluding the women, as there is nothing in the nature of the work very obviously rendering

* From Dr. Cameron's Annual Report for 1893.

them either more or less prone to death than those of the other sex. Dr. Ogle's comparative mortality factor for woollen workers was 1032, we therefore calculate on account of the prevalence of this industry (the mortality in which, amongst men between 25 and 65, was in excess of the mortality amongst all men of the same ages in the proportion of 1,032 to 1,000), that allowing a similar mortality amongst women similarly employed, a correction should be made of our death-rate upon this single account equivalent to multiplying it by 0.9989836.*

In a similar way the several trades for which comparative mortality figures are given by Dr. Ogle, have been got out. Where he has himself done so, however, such trades as the eleven classes of shopkeepers, or the various metal workers have been grouped together. Women workers have been included in such industries as the woollen, where they form an important part of those employed in the trade, but excluded from trades where it is evident from the statistics that the women are simply connected with the business carried on in the capacity of employer. Multiplying these factors into one another we get a general provisional trade factor of 0·986.

This factor, however, deals with only a portion of the population of Leeds. It takes into account 53 per cent. of the occupied males over 10, and 35 per cent. of the occupied women. Taking the two sexes together, the factor takes account of 66 per cent. of the total occupied population over 10, or together 31 per cent. of the total population. What, if anything, to allow for the remaining third of the occupied persons belonging to trades for which no factor is obtainable, it is difficult to say. This 34 per cent. of occupied persons not dealt with may belong to healthier or unhealthier trades. They are to some extent allowed for, in so far as they are remainders. For instance, in Leeds, in every 1,000 of our population, we had 1·68 agricultural labourers. In England and Wales the number was 24·46. Every 1,000 of our Leeds population, therefore, contains 22·78 fewer agricultural labourers than the average proportion in the country. These 22·7 must have been made up by persons otherwise occupied, and some of them belong to the 34 per cent. of occupied persons not dealt with in our calculation. Amongst unoccupied males between the ages of 25 and 65 in the whole of England and Wales, the mortality, as has been already said, was found by Dr. Ogle to be more than double that of the whole male population at the same ages. In Leeds 11 per cent. of the whole male population belonged to this class. In England and Wales 12 per cent. We had therefore in Leeds a very much smaller number in proportion of this class with a high death factor. Similarly, the unoccupied female population over 10 in Leeds was 47 per cent. of the whole female population in the city. In England and Wales it was 50 per cent. While, however, the unoccupied male population has a death factor higher than that of the whole population, this is probably due, as already pointed out, to the inclusion in this class of a large number of invalid lives. But though the halt and the maimed are possibly fewer in a manufacturing town, to a very large extent it seems probable that the smaller percentage of unoccupied persons is rather due to the want of a leisured class, so many of whom go away from our smoky atmosphere to brighter skies, and whose exclusion would increase our recorded death-rate.

Here, again, is yet another difficulty. While unoccupied men have specially a high mortality, it does not follow that the same is true of women. The census enumerator has probably been unchivalrous enough to return many women engaged in household occupations, otherwise than as domestic servants, as "unoccupied." These would of course include the infirm, but they would include also a very large proportion of the most long-lived members of the community.

To make the comparison complete, I should have wished, had time permitted, to obtain similar factors for at least the other five great towns. One thing will strike everyone, and that is that the factor 1·152 (the correction according to age and sex adopted by the Registrar-General), multiplied by the factor 0·986, obtained as above, still leaves a factor of 1·136, by which the death-rate has got to be multiplied. If we are to suppose that a corresponding correction must be made for trades for which we had no comparative mortality figure, the age and sex correction factor might have to be still further reduced.*

THE BACTERIOLOGY OF VACCINIA. — Messrs. Ruffer and Plimmer have found a minute parasite in the vesicles of vaccinia, about four times the size of an ordinary staphylococcus. It somewhat resembles the parasite of cancer, but differs in many minor particulars. Similar organisms have been found by them in small-pox pustules. The exact relationship of these organisms to vaccinia and variola is as yet uncertain.

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* Including those of both sexes employed in the manufacture of flannels and blankets the correction factor becomes 0·9989727.

* The factors given above are provisional. The formulæ employed are as follows :—

Let $\Delta =$ required and $\delta =$ observed death-rate.

Let $n =$ number per unit of population, by which a particular trade exceeds or falls short of the average of the country, and let $f =$ Dr. Ogle's comparative mortality figure.

Then $\Delta = \delta \left\{ 1 - \left(1 - \frac{1,000}{f} \right) n \right\}$ when n is $+$,

and $\Delta = \delta \left\{ 1 - \left(1 - \frac{f}{1,000} \right) n \right\}$ when n is $-$.

The quantity between the larger brackets is, of course, the correction factor for the trade.

REGULATION OF BAKEHOUSES.*

By T. Orme Dudfield, M.D., M.O.H. for Kensington.

Reference has been made frequently of late to the insanitary condition of bakehouses in London, due largely to the fact that the premises are as a rule underground, and were not constructed for the use to which they are applied. The matter has been mentioned in Parliament, and it forms the subject of a circular letter addressed (22nd May) by the Local Goverment Board to the several sanitary authorities, in which attention is drawn to the "powers and duties in this matter" of those bodies. The Board cite the sections of the Public Health (London) Act, 1891, and of the Factory and Workshop Acts of 1878 and 1883, which impose on the sanitary authority the duty of enforcing provisions "with regard to cleanliness, ventilation, and other sanitary conditions, with respect to any bakehouse which is a workshop within their district," the term "bakehouse" meaning "any place in which are baked bread, biscuits, or confectionery, from the baking or selling of which a profit is derived." The Board "attach much importance to a strict enforcement of the said provisions," and call attention to the means whereby, in a court of summary jurisdiction, they may be enforced, on the prosecution of a local authority, when "any bakehouse is in such a state as to be on sanitary grounds unfit for use or occupation as a bakehouse." The Board, therefore, "trust that the sanitary authority will give such instructions to their officers as will ensure that the bakehouses in their district to which the Act applies will be systematically inspected by them, and that when the statutory provisions are not complied with, that the facts will be reported to the sanitary authority, and that they will cause to be instituted such proceedings as may be necessary for a due enforcement of the law."

The attention of the Public Health and Housing Committee of the London County Council having been drawn to this subject, they instructed their medical officer to report "on the sanitary condition of bakehouses in London," and they have recently submitted a report to the Council, arising out of the medical officer's report, in which they state that they are satisfied that it is "very desirable that the provisions of the law with reference to bakehouses should be amended." They think, moreover, that "the central metropolitan authority rather than the local sanitary authority should have charge of the bakehouses of London, and that the Council should be empowered to make regulations which might deal with the following points :—

1. The position and structure of workshops and workplaces used as bakehouses and of rooms or places used in connection therewith.

2. The lighting, ventilation (including air-space), cleansing, drainage, and water supply of such premises.

3. The provision and situation of water-closets and urinals in connection with bakehouses.

4. The prohibition of the use of the bakehouses for other purposes than the preparation of food.

5. The use of any room adjoining or opening into any bakehouse.

6. The conduct of the business and the prevention of the contamination upon the premises of any articles of food prepared in any bakehouse or of any materials to be used in the preparation of food.

7. The mode of making application for licence to use any premises as a bakehouse.

The committee also consider that—

(*a*) No premises should be used as bakehouses which are not licensed by the Council, and that a licence should be operative for a period of five years, power being however given to the Council to suspend any licence for contravention of the regulations.

(*b*) That all bakehouses which are occupied for the first time after these regulations come into force should, before such bakehouses are occupied, be made to comply with all the regulations.

(*c*) That bakehouses which are occupied before the bye-laws come into force should be exempt for a period of five years from the regulations as far as these will require structural alterations other than those now required under existing law, but that after this period they should be required to comply with all the regulations.

The committee "point out that the Government has introduced a Bill for amending the Factory and Workshop Acts, and this seems to afford an opportunity for amending the law relating to bakehouses." They therefore recommend :—

That the Council do endorse the views expressed in this report, and give instructions for a copy of this report and of the medical officer's report to be sent to the President of the Local Government Board, with a request that he will take steps to obtain an amendment of the law relating to bakehouses in the manner here proposed.

In conclusion I would only further observe that it is matter for satisfaction that the Public Health and Housing Committee of the County Council above cited should have taken in hand this question of bakehouse regulation. It is one which the Council, from their position as central authority, will probably be able to carry to a successful issue. No exception can, I think, be taken to the view of the committee that the Council "should be empowered to make regulations" in regard to bakehouses; and little, if any objection can reasonably be made to the objects which regulation should subserve, as formulated in the report of the committee. Certainly your vestry would be the last body to enter objection to this part of the scheme, which is in practical agreement with the views formulated many years ago, and set out [in the historical review of the subject for which we, unfortunately, have not space—Ed. P.H.] and which would have been carried into practice had the necessary legal powers, for which application was made, been given. But it is to be hoped, should the Council adopt the suggestion of the committee in regard to the acquisition of power to make bye-laws for the regulation of bakehouses, that they will not adopt the opinion of the committee "that the central

* From Dr. Dudfield's Report for June, 1894.

metropolitan authority rather than the local sanitary authority should have charge of the bake-houses of London." The precedent of the Public Health (London) Act, 1891, is a case in point: the Council should be empowered to make bye-laws, but the duty of enforcing the bye-laws should rest with the local sanitary authority.

CUSTOMS AND INLAND REVENUE ACT, 1890.

SUMMARY OF REPLIES FROM LARGE TOWNS TO QUERIES SENT BY DR. ARMSTRONG, M.O.H. FOR NEWCASTLE-ON-TYNE, JUNE, 1894.

QUERIES were sent to thirty-one towns. Twenty-four replies have been received.

1. *As to Number of Applications for Certificate granted, etc.*

The medical officers of health of 14 towns have received no applications for a certificate.

The medical officers of health of two towns have granted one certificate each.

The medical officer of health of one town has granted two certificates.

The medical officer of health of one town has granted three certificates.

The medical officer of health of one town has received applications representing 130 dwellings. The large majority were refused.

The medical officer of health of one town refused applications referring to 28 tenements.

The medical officer of health of one town refused three applications.

In two towns the Act is useless (Huddersfield and Bradford), there being no tenement dwellings.

In one town (Bolton) the medical officer of health reports that "the Act is not in operation."

2. *As to Mode of Procedure on Application from Owner or Agent.*

The medical officers of health of five towns only answer the query directly.

In all of these inspection is made on application by owner or agent.

3. *As to Form of Queries.*

The medical officers of health of 15 towns reply that they have no form of queries.

The medical officers of eight towns do not answer the query (including three where the Act is useless or not in operation).

Newcastle-upon-Tyne.—The number of applications for certificates is ten. No certificate has been given. The mode of procedure hitherto adopted is as follows: On receipt of application for certificate of exemption from inhabited house duty a form of queries relative to the accommodation for the families inhabiting the dwellings and the provision made for their sanitary requirements is forwarded by the medical officer of health to the applicant. On receipt of the replies to the queries the premises are inspected.

CUSTOMS AND INLAND REVENUE ACT, 1890.
(Section 26. 2.)

EXEMPTION FROM INHABITED HOUSE DUTY OF HOUSES FOR ARTIZANS' DWELLINGS.

Houses for which the Certificate of the Medical Officer of Health is asked, viz.:—

.....

.....

QUERIES.	REPLIES.
1.—Are the aforesaid houses originally built, or adapted by additions or alterations, and used, for the sole purpose of providing separate dwellings for persons at rents not exceeding, for each dwelling, the rate of 7s. 6d. per week?	.....
2.—Are they occupied only by persons paying such rents?	.....
3.—Is each of the houses provided with a yard, properly paved or cemented and drained?	.....
4.—Has each tenement a sink, a water-tap, a coal-house, and a pantry or scullery of its own?	.....
5.—Is the sink disconnected from the drain, and made to discharge over a properly trapped earthenware gully?	.....
6.—Is there for each tenement, separate sleeping-room accommodation not opening directly into the day-room or any other room?	.....
7.—Is there water-closet accommodation provided on the premises, outside of the dwelling, at the rate of not less than one closet for every two tenants?	.....
8.—Is a movable receptacle provided in the yard for ashes?	.....
9.—Is there a wash-house on the premises for the use of the tenants?	.....
10.—Is the drain constructed of glazed earthenware pipes, properly trapped and disconnected from the main sewer and ventilated?	.....

Signed,.....

Date ..... Address, ...

Owner (or Agent) of the above-named Houses.

N.B.—On the Medical Officer of Health receiving the owner's (or agent's) statement, in writing, that the dwellings in question comply with each of the above requirements, the owner (or agent) will be requested to afford facilities for the examination of the drains; and, upon his notifying to the Medical Officer of Health that such facilities are afforded, an examination of the house will be made, for the purpose of ascertaining whether, having regard to the above and any other matters affecting the suitability of the accommodation of each house, and the provision made for the sanitary requirements of the persons inhabiting it, a certificate under the Act can properly be given.

HENRY E. ARMSTRONG,
Medical Officer of Health.

Health Department, Town Hall,
Newcastle-upon-Tyne, May, 1891.

As bearing on the same subject we may here

insert the form of Certificate which is in use by Dr. Sykes at St. Pancras.

CERTIFICATE OF MEDICAL OFFICER OF HEALTH.

Having been furnished with evidence that the assessment to Inhabited House Duty of the house described below will be wholly or partly discharged by the Commissioners acting in the execution of the Acts relating to Inhabited House Duties, provided that a Certificate of the Medical Officer of Health be produced, and having been requested to furnish the said Certificate, I hereby certify that I have examined the house described below, and am of opinion that the house is so constructed as to afford suitable accommodation for each of the persons inhabiting it, and that due provision is made for their sanitary requirements, these words being interpreted to mean that the house is so constructed :—

1.—That each of the persons inhabiting it is provided with at least four hundred cubic feet of air space.
2.—That each of the living or sleeping rooms is at least eight feet in height, and at least sixty-four square feet in area.
3.—That there is at least one draw-tap and sink, with a sufficient supply of water thereto, for every twelve occupants or less, on each floor.
4.—That there is at least one water closet, properly supplied with water, for every twelve occupants or less, on each floor.
5.—That the drainage of the premises is in accordance with the Regulations recognised by this Authority.
6.—That accommodation for clothes-washing is provided, sufficient for the number of persons inhabiting the house.

Name and Situation of House.....
.....
Name of Owner or Agent.....
Date.....

.....
Medical Officer of Health for the
District of St. Pancras.

In addition to the above, questions of light and air are decided on the merits of each individual case, and conditions which can be rectified under the Public Health Act are omitted.

ENTERIC FEVER IN THE COUNTY OF DURHAM.*

By T. EUSTACE HILL, M.B., B.Sc., County Medical Officer of Health for Durham.

THE past year was remarkable for the extreme prevalence of this disease in very many of the sanitary districts of the county. The number of deaths during the year was 447, equal to a death-rate of 0·60 per 1,000, against 131 deaths in 1892, with a rate of 0·19 per 1,000. In England and Wales, the death-rate from enteric fever, though higher than for several years past, was only 0·21 per 1,000, or a little more than a third the rate for this county. The total number of cases notified in the county was 2,674, giving a case mortality of 16·7 per cent., and a sickness rate of 0·60 per 1,000 of the population. The death rate per 1,000 population from enteric fever was in Sbildon, 3·9; Bishop Auckland, 1·6; and Houghton (Northern Division), 1.6; while it exceeded 1·0 per 1,000 in Houghton-le-Spring, Southwick, and in the Easington rural district. The only sanitary district in which no death from enteric fever was registered during 1893 was Stanley (urban).

* From Dr. E. Hill's Annual Report, 1893.

There can be no doubt that the chief predisposing cause of the exceptional prevalence of the disease was the seasonal conditions of last year which were extremely favourable for its development, the great heat promoting rapid decomposition, while the extremely dry weather seriously affected the water supplies in many districts, and also prevented the proper flushing of sewers and drains. Various explanations of the actual cause of the disease are given by the district medical officers of health (including in individual cases polluted water and milk, the opening out of some old sewers, leakage from privy-middens). . . . In the northern division of the Houghton rural district, enteric fever outbreaks at Penshaw and Warden Law were undoubtedly the result of the importation of infected town manure from Sunderland. . . . But in many villages where enteric fever was very prevalent the sanitary circumstances were very fair, and no suspicion could with certainty be attached to either the milk, or water supply, or drainage. I investigated several outbreaks of this description and was forced to the conclusion that the methods of excrement disposal and removal employed were the most probable cause of the disease. Whatever the cause of the first case of enteric fever in such places—whether by introduction from another district, or by an ordinarily innocuous organism assuming under favourable conditions the pathogenic properties of the typhoid bacillus, or by any other means—it is highly probable that the excreta of such patient are at first thrown into the ashpit without disinfection. The contents of an ordinary midden privy are favourable for the existence and development of the typhoid bacillus, and during the time that the middens are being emptied the germs of the disease are most likely to be disseminated.

In most of the houses of the working classes in this county the midden-privies are situated within a few yards of the back doors and pantry windows, and their contents are, at any rate in the colliery villages, almost invariably removed during the day when both the back door and the pantry window will, especially in hot weather, often be open, and when food will be lying about. The dust created by the emptying of a large midden either directly into the scavenger's cart, or first on to the ground and then into the cart, is very great, and if there is any wind much of this dust, carrying infected matter (if infected excreta have been thrown into the ashpit), is carried into the nearest houses, and must settle on the furniture, food, etc. Frequently also in the colliery villages the scavenger's open carts carrying the contents of several middens have to pass along the street within a few feet of the doors of the houses, and the light dust from these is often blown into the houses.

According to experiments by Uffelmann (*Brit. Med. Journal*, May 5th, 1894) the typhoid bacilli retain their power of development in house and

street sweepings for at least 30 days in a dry air, and for a longer time in a moister atmosphere (such as a midden), and his experiments also establish that the bacilli are carried into the air with dust from floors, streets, and clothing, and are thus enabled to infect milk and other food.

Dr. Mitchell, M.O.H. for Hepburn, County of Durham, gives as his opinion that while the predisposing causes were the extreme heat and prolonged drought, the distribution of the disease, especially during its early prevalence, pointed to the actual cause being in some way dependent on the ashpit-privies; for though there are many more ash closets in the town than midden-privies, there were more than three times as many cases in houses dependent on the latter form of privy accommodation.

ENTERIC FEVER AT ST. HELENS.*

By R. Nicholl, M.R.C.S., late M.O.H. for St. Helens.

I have been able to calculate the number of cases of sickness from typhoid fever per 1,000 of the population in the large towns of England during 1893, and this table is printed below;—

Rate per 1,000 *of Cases of Sickness from Typhoid Fever*, 1893.

London	·85	Manchester	1·2
Croydon	·33	Oldham	·51
West Ham	1·5	Burnley	1·3
Norwich	3·0	Blackburn	1·2
Plymouth	·64	Preston	1·7
Bristol	·50	Huddersfield	·58
Wolverhampton	1·8	Halifax	·73
Birmingham	1·0	Bradford	·96
Leicester	2·0	Sheffield	1·3
Nottingham	2·2	Hull	3·0
Derby	1·09	Sunderland	6·00
Birkenhead	2·1	Newcastle-on-Tyne	·71
Liverpool	2·7	Cardiff	·72
Bolton	1·3	Swansea	1·1
Salford	2·7	St. Helens	4·2

From the above it will be seen that only one town had a larger sickness rate from typhoid fever amongst the great towns of England than St. Helens. Amongst the smaller towns there were several which had as great or greater rates than St. Helens.

The main factors in producing this disease at St. Helens have been dwelt upon in former reports, and during the last year additional evidence has accumulated that these factors do play the important part that has been ascribed to them. Of the cases of typhoid fever 1·1 occurred per 100 houses on the w.c. system; 3·4 occurred per 100 houses on the privy system; and 1·7 occurred per 100 houses on the tub and pail system. Therefore, typhoid fever occured twice as frequently in houses on the privy system as in houses on the tub and pail system, and three times as frequently as in houses on the w.c. system. This is in complete accordance with the result obtained in 1891.

* From Mr. Nicholl's Annual Report for 1893.

PREVENTIVE MEASURES IN SMALL-POX.*

By A. Wellesley Harris, M.R.C.S., etc., M.O.H. for Southampton.

From January 1st to September 15th, 1893, 153 cases of small-pox occurred in Southampton, being a continuance of the outbreak which began December 25th, 1892. The difficulty experienced in controlling this outbreak was in a great measure due to the fact that the majority of cases existed in the courts and alleys. From the description of these places given in the recent special report, the dangers with which we were beset at the time of the outbreak will be readily understood. The whole of this number, with one exception, were isolated in hospital by the Health Authority, the one exception being due to the condition of the patient precluding his safe removal. He died at home a few hours after notification of the case.

Our system of procedure in cases where opposition was offered to removal was to place two inspectors outside the house to warn and prevent persons from the outside entering, and to caution persons leaving the house that legal proceedings would be taken against them for exposing infected articles, namely, their clothing, to the common danger of the public, they coming from an infected house, under the provisions of the Public Health Amendment Act. This had the effect of soon bringing a request from those having the custody of the sick, or from the patients themselves, to be admitted to hospital.

Every possible care was taken to check the spread of the disease. The medical officer of health, without waiting for the result of his notification to the vaccination officer, visited every house in which cases occurred, and in the immediate neighbourhood, offering gratuitous vaccination. Notices were also issued that persons might be revaccinated at his office every evening at seven o'clock. By this course between three and four hundred vaccinations were carried out. Several persons who had been exposed to infection refused revaccination, many of them contracting the disease at the termination of the usual period of incubation.

Case 43 is an excellent example. Two constables had occasion to visit a house in which a boy was suffering from small-pox (discovered after their visit). Finding they had made this visit, I immediately inquired at head-quarters who these men were, and informed the inspector that they should be immediately revaccinated, and that I would perform the operation if they would come to my house. When they came I could persuade only one to submit to the proposal, with the result that he escaped, while the other, who refused, was admitted to hospital a fortnight later with severe confluent small-pox, from which he nearly lost his life.

* From Mr. Harris' Annual Report for 1893.

Out of hundreds of persons who were revaccinated either by myself, the public vaccinators, or private medical practitioners during the outbreak, only two cases, Nos. 3 and 28, contracted the disease, and in them it assumed a mild form.

Five patients had been revaccinated, Nos. 1, 15, 29, 62, 90, at varying periods before admission (see table), before contracting the disease. Among the number of unvaccinated persons are included persons in whom no trace whatever of the operation can be found. In such cases it will be seen, with hardly any exception, the disease assumed a severe form.

Of the eight fatal cases due to this disease all occurred among unvaccinated persons.

It is further interesting to note that all persons employed at the hospital were revaccinated before commencing duty, and in no instance did a member of the staff contract small-pox, in spite of their daily contact with the disease.

THE NECESSITY OF EARLY ISOLATION IN SMALL-POX.*

By Jas. Wheatley, M.D.Lond., M.O.H. for Blackburn.

The necessity for early removal of patients is shown in the following table. It states how long the cases of small-pox had existed before removal to the hospital, and the number of persons infected from these cases.

Date of Removal. (The day of appearance of the rash is called first day.)	Number of Cases.	Persons infected from these cases.
1st	25	—
2nd	24	—
3rd	10	3
4th	10	8
5th	6	8
6th	2	2
14th	1	6
21st	1	11

This table shows clearly, what one would expect, that the danger of infection increases very greatly the longer isolation is delayed. It also appears to point to the fact that the danger of infection during the first day or two is not very great. The three cases that were supposed to be infected from one removed on the third day are not quite conclusive. They occurred in Larkhill common lodging-house, where there had been several previous cases, and the infection might have been lingering about the house itself. The history of the epidemic in this house is very instructive, as it demonstrates most clearly the advantages of early removal.

On January 23rd an imported case was removed on the second day of the rash. No case followed. On March 9th a man was removed with a rash four or five days old. On the 23rd, 24th, and 25th seven more cases were taken away that could be traced clearly to this man. The inmates of the lodging-house refused to be re-vaccinated. Quarantine was out of the question on account of the large number of lodgers, about 150. Under these circumstances we had to rely upon the early removal of cases and isolation of any suspicious case of illness. To this end an inspector was told off to keep the lodgers constantly under his observation, so as to report the slightest illness or skin eruption. The result was eminently satisfactory. Four more cases occurred, one on each of the following days: March 30th, April 4th, 7th, and 11th. Two of these were isolated before the appearance of the rash, and the other two immediately the rash broke out. No further cases occurred, and what threatened to be a troublesome local epidemic was stamped out.

Early removal of the cases depends upon:—

1. Early notification by medical men.

2. Early discovery by officials of the Health Department.

There are a considerable number of cases of small-pox which are unattended by medical men. A fact no doubt due to the modifying effect of vaccination, which converts in many cases a very fatal disease into a very mild one. It is, therefore, all the more necessary that additional means should be taken for discovering cases as early as possible. Besides the nightly visitation of the lodging-houses, the most efficient means have been the visitation of all those who have been the least degree in contact with a small-pox case.

* From Dr. Wheatley's Annual Report, 1893.

THE DIFFUSION OF INFECTION BY SMALL-POX HOSPITALS IN TOWNS.

By H. Scurfield, M.D.Edin., D.P.H.Camb.

Although the nature of small-pox infection is unknown, it is perhaps justifiable to assume that it is not gaseous, and does not obey the law of the diffusion of gases, and that it does consist of micro-organisms, which depend for their locomotion on clinging to different moving objects, including the particles of dust, etc., of which the air is full, and which are blown about by currents of wind.

There seem to be several reasons why the aerial diffusion of infection should be greater in summer than in winter.

1. In the summer there would be more dust, pollen, etc., in the air, and insects would be more numerous.

2. The temperature would be more suitable for maintaining the life of micro organisms.

3. In the summer, perflation through opposite windows is largely used for the ventilation of hospital wards, the air charged with infected dust thus being able to escape freely, while in winter the windows act chiefly as fresh air inlets, and the chief outlet is the flue of the stove or fireplace, the infected air losing a part of its infectivity by exposure to the heat of the fire and hot flue.

From Dr. Priestley's report for Leicester, it

appears that the effect of the hospital in diffusing infection was greater in June than in February.

To get rid of air-borne infection, I would suggest:

1. That perflation be abandoned as a means of ventilating small-pox wards.

2. That the stove flues be used as extractors of foul air all the year round, and that means be taken to expose a considerable length of the flues to extreme heat, so as to disinfect the air passing out. This might be done by bending the flue in the stove, so as to expose a considerable length of it to the heat of the stove when lit, and by exposing a suitable length of the flue to the furnace used for keeping up the hot water supply of the wards, or if steam were used for that purpose by enclosing a suitable length of the flue in steam coils.

3. That the windows be opened only at one side of a ward at a time, and that they and the other fresh air inlets be covered by gauze screens to prevent insects flying in and out.

THE WATER SUPPLY OF STOCKPORT.

At a special Council meeting on July 11th, the Corporation of Stockport considered the report on their water supply, recently issued by Dr. Charles Porter, their medical officer of health, and also the reply of the Stockport District Waterworks Company. The company's document consists mainly of references to a few quite immaterial verbal errata in the description of the gathering ground, to nearly all of which the medical officer of health had himself called attention on a slip issued a month before the date of the company's reply. The main issues of the report are carefully avoided, and the reply appears to be little more than an attempt to throw dust in the eyes of the public. The company adopt as their own a statement that if drinking water be filtered even through the ordinary sand filter used at waterworks before being supplied to towns, those using such supplies do not suffer from cholera. This fact, together with their assertion that their process of filtration is satisfactorily carried out (notwithstanding the fact that a special test revealed a rate of $5\frac{1}{8}$th gallons per square ft. per hour), would lead us, if only for the sake of the public health, to commend to the perusal of the directors of the Stockport Water Company Professor Koch's paper on "Sand Filtration and Cholera." They will find a study of the Hamburg-Altona cholera experience invaluable, and will perhaps be surprised to learn Professor Koch's conclusion, "that according to all we have learned about sand-filtration, it cannot even under favourable circumstances give absolute protection against the danger of infection."

The only other point to which we will refer is the Water Company's statement that a supply of thirty gallons per head is unnecessarily large for a manufacturing town such as Stockport. Having considered their remarks as to local circumstances, we are unable to admit that a supply of thirty gallons per head can be regarded as in any way excessive. This is, however, a question upon which it is not at all surprising that sanitarians and water-vendors will differ acutely, the former having the public weal alone to consider, while the latter have to look to their dividends.

It is satisfactory to record that the Corporation of Stockport having fully considered Dr. Porter's report and the water company's reply, by an overwhelming majority adopted a vote of confidence in their medical officer, and specially thanked him for the report.

LONDON COUNTY COUNCIL.

Conference on Infectious Disease and Vagrancy, July 19th, 1894.

This conference was very largely attended by representatives from a large number of provincial and metropolitan local authorities. The following resolutions were agreed to after protracted discussion:

1. That common shelters which are not subject to the law relating to common lodging-houses should be made subject to such law.

2. That there should be power to the local authority to require medical examination of all persons entering common lodging-houses and casual wards, and that each inmate of a common lodging-house or casual ward should on admission have a bath of fresh water.

3. That the local authority should have power to order the keeper of a common lodging-house, in which there has been infectious disease, to refuse fresh admissions for such time as may be required by the authority.

4. That the local authority should be empowered to require the temporary closing of any common lodging-house in which infectious disease has occurred.

5. That the local sanitary authorities should have power to require the detention of any inmate of a common lodging-house or casual ward who may reasonably be suspected of being liable to convey infectious disease.

6. That means should be provided for the detention and isolation of any vagrant found wandering in a public place, if reasonably suspected of being liable to convey infectious disease.

7. That the local authority should have full power to require the disinfection of the person and clothes of any person in a common lodging-house or casual ward, whether infected or exposed to infection.

8. That arrangements should be made by which the occurrence of infectious disease in common lodging-houses or casual wards should be made known by the local authority of the district to the local authorities of other districts.

9. That local authorities should be empowered to require the vaccination or revaccination of persons in common lodging-houses or casual wards who are exposed to the infection of small-pox.

LAW REPORTS.

Arsenic in Glycerine.

At the Leeds Police Court on July 6th, before the Deputy Stipendiary magistrate, Mr. Vincent Thompson, trading as Messrs. Hobson and Trimble, grocers and drysalters, Leeds, were summoned at the instance of the Leeds Corporation for a breach of the Food and Drugs Act. Mr. Bairstow prosecuted, and defendant was not represented by counsel.

In his opening Mr. Bairstow said that it had come to the knowledge of the authorities that glycerine was being extensively sold in Leeds which contained arsenic. For the purpose of testing the matter purchases were made from time to time. He did not know whether it would be necessary for him to make any statement with regard to what had transpired relating to this particular defendant, but as he had not instructed counsel he would confine himself to the particular charge. On the day in question, he continued, Charles Gill, the assistant of the inspector of food and drugs (Mr. Walker) went to the defendant's shop and asked for a bottle of glycerine from defendant's assistant. The latter asked, "Is it for inward or outward application?" and Gill replied, "I want it for a friend." He was then supplied with a pound bottle of glycerine, and Walker, entering the shop, informed him of the reason for the purchase in compliance with the conditions of the Act. The assistant refused to take advantage of the offer to take a portion of the glycerine for separate analysis. The glycerine was afterwards found to contain two grains of white arsenic per pound. Mr. Bairstow went on to refer to the section of the Act under which the proceedings were taken, and in reply to the magistrate said that he did not suppose anybody would take a pound of glycerine. But he did say that arsenic in the smallest quantities was injurious to health. He did not say that to take two spoonfuls would necessarily do any harm, but if a purchaser took home a bottle and allowed his children to take it, great risk would be run of injury to health. If a grown-up person took the glycerine he would possibly have to take a considerable quantity before he was seriously injured. His argument was that if a person went into a shop and asked for glycerine he had a right to expect pure glycerine and nothing else, especially when it was labelled "pure glycerine," as was the case in this instance. Mr. Bairstow, continuing, said that there was no doubt that in this case the article supplied was to the prejudice of the purchaser, and was not of the substance, nature, and quality demanded by him.

The Magistrate: Was there any intimation on the bottle that it was for outward application only?

Mr. Bairstow, in reply, said that that was not the case, and that if the defendant had adopted that course there would be an end to these prosecutions against him.

William Gill, assistant to the food inspector of the city, spoke to purchasing the glycerine in question from an assistant at Mr. Trimble's shop on May 19th last. It was a pound bottle, and contained the label "Warranted pure." He paid tenpence for the bottle. He was asked whether it was for outward or internal use, and witness replied, "It is for a friend." The bottle produced was then bought by the witness, who remained in the shop until the inspector came in.

Walter Burgess Walker, inspector of foods and drugs for the city, said he received the bottle from the previous witness. He told the shop assistant that he was going to have the glycerine analysed, and offered to divide it into three parts so that the assistant might have a third of it. The assistant, however, said it did not matter, and witness took the whole of the glycerine away. Witness afterwards saw defendant, who protested against the number of samples that had been bought from himself and another chemist without any action being taken in the matter. He said the glycerine was not in any way adulterated, and observed that it was persecuting tradesmen to behave in the way the authorities had done. In the interval that had taken place numbers of people might have been poisoned if the glycerine was adulterated as alleged.

Witness, in the course of further cross-examination by defendant, said that on seeing the assistant Page the latter said, "We only sell it for outward use."

Mr. Bairstow, at the conclusion of Mr. Walker's evidence, produced a document in which the defendant had promised to withdraw the glycerine from sale. That was the reason proceedings had not been taken before. It was since that promise had been made that the bottle in question had been purchased.

The Defendant: There is one word omitted in that letter which alters the whole phase of it, that is the word "inward." What was meant was that the article had been withdrawn for "inward" use.

Mr. Thomas Scattergood, surgeon, said that glycerine was an article of common use and a medicine. He believed it was used largely in combination with lemon-juice for sore throats. It would be very dangerous if taken indiscriminately internally. A teaspoonful would contain about a fiftieth part of a grain of arsenic, which would be the smallest dose of arsenic given medicinally.

Mr. Bairstow: If used in making up prescriptions would the danger be greater or less?

Witness: I should say it would be greater, because it would be administered regularly.

Witness was cross-examined at some length by the defendant with the object of showing that the quantity of arsenic in a pound of glycerine was so small that in the ordinary course no harm would be done to the purchaser. Mr. Scattergood denied this, and said he would not like glycerine of thi

kind to be used in the making up of his prescriptions.

Dr. Cameron, medical officer of health for the city, said there was no difficulty in obtaining pure glycerine, and there was no reason why arsenic should be in it. A teaspoonful of the glycerine in question, given to a child, would contain more than the minimum medicinal dose of arsenic, and would, therefore, be injurious. Of such a danger the public certainly ought to be warned.

By Defendant: Two grains of arsenic were the recognised quantity calculated to be fatal.

Mr. Fairley, the city analyst, was called, and said it was not a proper thing for glycerine to contain arsenic, nor was it necessary for it to do so.

In cross-examination by the defendant, witness said that if pure acid were used in extracting the glycerine from the soap grease there would be no arsenic in it. He was not aware that the further distillation of the glycerine would materially increase the cost. Out of eighteen samples tested by him only seven were absolutely pure, and some of the others contained arsenic in small quantities not of material importance, and five varying from 9-10th grain to four and a-half grains per pound.

The Magistrate: And you consider two grains per pound a material adulteration?

Witness: Certainly, sir.

This concluded the case for the prosecution.

Defendant then addressed the Court. He said that after other samples of glycerine had been bought by Inspector Walker he gave orders to the managers of his branch shops not to sell it except for outward application. As a matter of fact, he said, that was the condition on which the glycerine, which was the basis of the present proceedings, was sold. Under these circumstances, he said, he contended that there was no evidence to show that it was sold to the prejudice of the purchaser.

The magistrate said that, in his opinion, the case had been fully made out.

In reply to a question, the gaoler said that defendant was fined £1 and costs for selling peas adulterated with sulphate of copper in May, 1892.

The magistrate pointed out that under the Act defendant might have been proceeded against for the present defence for a misdemeanour, in which case he would have been sent to prison. He would have to pay a fine of £3, and costs—£3 14s. 6d. —Abstracted from the *Yorkshire Evening Post.*

Adulterating Peppermint Lozenges.

At the North Holland Petty Sessions, at the Sessions House, Boston, before Dr. Mercer Adam and other magistrates, a grocer was recently charged with having sold peppermint lozenges adulterated with raw potato starch. There were two summonses, the first charging the defendant with having unlawfully sold a certain article of food, to wit, peppermint lozenges, which were mixed with not less than 10 per cent. of raw potato starch, so as to render such article of food injurious to health, contrary to section 3 of the Food and Drugs Act, and the second charging him with having unlawfully sold a certain drug, to wit, peppermint lozenges, which were mixed with not less than 10 per cent. of raw potato starch, so as to affect injuriously the quality or potency of such drug, contrary to section 4 of the Food and Drugs Act.

Mr. Snaith, the public analyst, stated in his certificate that the lozenges of the British Pharmacopœia consist of sugar, gum acacia, and the medicinal substance they represent. The use of starch would increase the bulk, weight, and profit, and would take the place of much of the gum acacia. Gum acacia is worth from 1s. 6d. to 5s per pound—potato starch (farina) is worth less than 1½d. per pound. Raw starch is considered injurious, as tending to induce or aggravate fermentative dyspepsia. In giving evidence he also stated that the raw starch would tend to minimise the antiflatulence effect of the peppermint. He said that the British Pharmacopœia was silent as to the amount of peppermint in each lozenge.

Dr. Pilcher gave confirmatory evidence.

The Bench decided to dismiss the case, "without prejudicing the case as to the adulterated character of the lozenges. If the defendant continued to deal in them he would do so at his own risk."

Regina v. Dennis.

Sale of unsound food—Fruit sold in bulk under condition that unsound part be destroyed—Public Health (London) Act, 1891, *section* 47.

This case decides a question of importance under section 47 of the Public Health (London) Act, 1891, as to the liability of wholesale dealers or brokers for having, for the purpose of sale as human food, articles of food unsound and unfit for the food of man.

Sub-section 1 of section 47 provides that any medical officer of health or sanitary inspector may at all reasonable times enter any premises and inspect and examine any article, solid or liquid, intended for the food of man, and sold or exposed for sale, or deposited in any place for the purpose of sale or of preparation for sale, the proof that the same was not exposed or deposited for any such purpose, or was not intended for the food of man, resting with the person charged; and if any such animal or article appears to such medical officer or inspector to be diseased or unsound or unwholesome or unfit for the food of man, he may seize and carry away the same himself, or by an assistant, in order to have the same dealt with by a justice.

Sub-section 2 of the same section provides for the condemnation by a justice of the articles so seized, and enacts that the person to whom the same belonged, or in whose possession the same were found, should be liable, on summary conviction, to fine or imprisonment.

By sub-section 3 of the same section it is enacted that, where it is shown that any article liable to be seized under that section, and found in the possession of any person, was purchased by him from another person for the food of man, and when so purchased was in such a condition as to be liable to be seized and condemned under that section, the person who so sold the same is to be liable to fine and imprisonment, unless he proves that at the time he sold the said article he did not know, and had no reason to believe, that it was in such condition.

In this case the defendant, who was a fruit broker, was indicted at Quarter Sessions for an offence under sub-section 3 of section 47.

The facts were that the defendant had received into his warehouse a consignment of eighty-three bags of Grenoble walnuts for sale on behalf of a foreign owner. One bag was taken from the bulk as a sample, and the walnuts in it proved to be good. When the bulk was received by the defendant there was nothing in the external appearance of the remaining packages or in their weight or smell to indicate that they were not equal to the sample. It was admitted by the defendant that the walnuts were of a cheap quality, and that their husks having been removed by chemicals they were liable to go bad quickly, and that when he sold the bags, the subject of the proceedings, he knew that most of them would in all probability contain a greater or less number of bad walnuts. Ten bags of the walnuts were sold to a customer, eight of which were returned as bad. In the meantime, before the return of the eight bags, Charles Lyons, another purchaser, had examined the sample and bought twenty other of the bags. None of the walnuts bought by Lyons were ever offered by him for sale, for on his emptying out the bags he discovered that the greater number of the walnuts were bad. He then determined to return the nuts to the defendant, but was unable to do so at the time, the defendant's place of business being closed for the day, and he subsequently handed them to the sanitary inspector for the Vestry of Bermondsey, by whom they were taken before a police magistrate, condemned as unfit for the food of man, and ordered to be destroyed.

It was proved by the defendant that a notice was exhibited in his premises where the purchase of the walnuts by Lyons took place intimating that packages of fruit or vegetables, the contents of which might prove partly unsound, were sold on the express condition that the buyers should sort the contents and destroy the unsound portion before they were offered to the public. It was also proved that it was the practice of fruit brokers in Covent Garden to sell foreign fruit in the packages in which it comes from abroad without examining the contents except by opening one or more samples, and by inspecting the outside of the packages for signs of damage, and by testing their weight and smell; that packages were frequently sold although the brokers knew or had reason to believe some part of the contents were unfit for human food; but that, as between the brokers and the buyers, it was the buyers' duty to see that the bad fruit was separated from the good and destroyed, and that none of it was offered to the public.

At the hearing at the Quarter Sessions it was contended for the defendant that no offence under sub-section 3 of section 47 had been shown, because that sub-section only applied where the person in whose possession the articles in question were found had himself committed an offence under sub-section 2; secondly, that if the defendant had contracted with Lyons that Lyons should, in accordance with the notice, sort out and destroy the unsound walnuts, the defendant would not be guilty of the offence charged, and that the notice was evidence of such a contract; and, thirdly, that the jury should be asked whether the defendant, when he sold the packages, knowing there was some bad fruit among them, intended the bad or only the good fruit for the food of man.

The chairman of the Quarter Sessions overruled the first and second contentions, and declined to leave the third question to the jury, and he directed the jury to find the defendant guilty if they found that he sold the walnuts to Lyons, and that the walnuts were at the time of the sale unfit for food of man, unless they were satisfied that the defendant at the time of the sale did not know and had no reason to believe they were unfit for the food of man. He further directed the jury that the defendant could not contract himself out of the Act, and that the notice as to the sorting out of the bad fruit must be disregarded.

The jury found the defendant guilty, and a case was stated for the opinion of the Court for the consideration of Crown Cases Reserved as to the propriety of the conviction.

The case was first heard before five judges, but as a difference of opinion arose, and the question was important, it was re-argued before a Court consisting of eleven judges. The judgment of the Court was delivered on May 28th last, Justices Hawkins, Cave, Wills, Grantham, Charles, Williams, Lawrance, Wright, Collins, and Kennedy being of opinion that the conviction was wrong, and Mr. Justice Mathew holding that it could be supported.

The majority of the judges held that in order to convict a person of an offence under section 47 of the Public Health (London) Act, 1891, of having sold for the food of man an article unfit for the food of man, it was necessary to prove that the article at the time it was found in the purchaser's possession was liable to be seized for one or other of the reasons stated in sub-section 1 of the section; that is to say, because, being diseased, unsound, unwholesome, or unfit for the food of man, it was

exposed for sale or deposited in some place over which the purchaser had control for the purpose of sale or preparation for sale; and further, assuming such facts to be proved, that it was a question for the magistrates or jury, having regard to all the circumstances of the sale, to say whether or not the article was intended for the food of man by the defendant when sold by him, and whether, if it was represented at the time of sale not to be so intended, such representation and sale were made *bona fide*. They accordingly held that the conviction was wrong, inasmuch as the walnuts were not at the time they were handed by the purchaser to the sanitary inspector "sold, exposed for sale, or deposited in any place for the purpose of sale or of preparation for sale" within the meaning of sub-section 1 of section 47, and inasmuch as the jury had been misdirected, it being a question for them, having regard to the evidence as to practice and as to the notice exhibited at the sale, whether or not the defendant intended the bad walnuts for the food of man.

On the other hand, Mr. Justice Mathew held that the conviction could be supported, and that the chairman of the Quarter Sessions had left the right question to the jury, and was right in directing them to disregard the notice. There was no reason to doubt that when the defendant sold the walnuts to the retail dealer they were liable to be seized, because they were then intended for the food of man, and sold to be used for the food of man. As to the notice, assuming that it showed a contract in its terms, the question was whether the defendant could be relieved from the obligation not to sell for human food articles unfit for human food. If so, then a similar notice might be set up to relieve the retail seller, and the result would be to defeat the Act and take away the protection it was intended to afford to purchasers.

The conviction was therefore quashed in accordance with the opinion of the majority of the judges.

This case is also reported in 10, Times Law Reports, p. 498; 97, Law Times, p. 99; and 28, Solicitors' Journal, p. 513.

MEASLES NOTIFICATION.—On December 10th, 1889, the Lincoln Rural Sanitary Authority passed a resolution including measles among the diseases to which the Infectious Disease (Notification) Act, 1889, should apply. On May 15th, 1894, this order was revoked, subject to the approval of the Local Government Board, which was given on July 2nd.

MR. H. GILBERT WHYATT, A.M.Inst.C.E., M.San.Inst., Deputy Borough Engineer, Salford, will deliver a course of twenty evening lectures on "Sanitary Engineering" at Owens College during the coming winter. The lectures form a portion of the whole course in connection with the certificate of proficiency in hygiene and sanitary knowledge issued by the Victoria University.

QUERY COLUMN.

Question.—Has a medical officer of health power upon receipt of a notification to insist upon (1) a right of entry to the premises, (2) entrance to the house, (3) admission to the bed-room of the patient? If so, kindly state under what section of what Act.

Answer.—The Infectious Disease (Notification) Act gives no right of entry for the purposes of this Act. It simply provides for the reception of information as to cases of the scheduled infectious diseases. It is, however, very exceptional for a medical officer of health to be refused entry to a house for the purpose of making the necessary inquiries as to the origin of a case of infectious disease, and of taking means for preventing its spread. It is probable that entry to any premises could be obtained under section 102 of the Public Health Act, 1875, which enacts that the local authority, or any of their officers, shall be admitted to any premises for the purpose of examining as to the existence of any nuisance thereon, etc. An infectious disease is not a "nuisance" within the meaning of the above section, but it is extremely improbable that, admission having been obtained, information as to the infectious case would be refused. Furthermore, in districts where this Act is adopted, the Infectious Disease (Prevention) Act, 1890, gives power of entry (section 17) to any officer appointed in that behalf for the purpose of carrying into effect the provisions of section 5 of the Act, relating to cleansing and disinfection of premises.

The only Acts of Parliament definitely giving power to the medical officer of health to visit premises on receipt of information that a case of infectious disease has occurred upon them are (1) the Canal Boats Act, 1877, section 5 of which enacts that 'Where any person duly authorised by a . . . sanitary authority . . . *has reasonable cause to suppose* that there is on board a canal boat any person suffering from an infectious disorder, he may, on producing (if demanded) a copy of his authorisation . . . enter by day such canal boat and examine the same and every part thereof . . . and may, if need be, detain the boat for the purpose . . . ." And (2) the Public Health Act, section 137, which enacts that the local authority and their officers shall have power of entry on any premises or vessel for the purpose of executing or superintending the execution of any regulations issued by the Local Government Board (under section 134). It will be remembered that section 134 gives the Local Government Board power to issue such regulations "when any part of England is threatened with any formidable epidemic, endemic, or infectious disease," and deals with an exceptional state of matters.

The general order of the Local Government Board prescribing the duties of medical officers of health lays down that he shall "on receiving information of the outbreak of any contagious, infectious, or epidemic disease of a dangerous character within his district, visit the spot without delay and inquire into the causes and circumstances of such outbreak, and in case he is not satisfied that all precautions are being taken, he shall advise, etc."

MUNICIPAL HOUSES.—The following figures as to attempts made by local authorities to house the working classes are interesting. Liverpool has housed 1,300 people at a cost of £130,816. Greenock has erected dwellings for 890, and Glasgow, Nottingham, and Huddersfield have become the owners of artizans' dwellings. Glasgow has also tried the experiment of erecting lodging-houses for men and women, in which beds are let at from 3d. to 4½d. per night. The £87,000 invested in the erection of these lodging-houses has yielded a profit varying from 4½ to 5½ per cent.

ANNOTATIONS.

The Pail System in Huddersfield.

There are, roundly speaking, 16,000 tubs and 14,000 ashpits in 12,000 acres—the area of the borough of Huddersfield. The system of tubs if attended to every two or three days would be the best, but this is impracticable in view of cost, for even the emptying of them within the fortnight amounts now to £7,000, and if tubs are to be allowed in outlying districts as they are at present the expenditure must increase. These tubs alone, minus ashpits, represent a superficial area of 3,879 square yards, 15 inches deep if collected together, and therefore, are no mean factors in contaminating the air in the immediate neighbourhood of dwelling-houses. The opposition of landlords and ratepayers to the deposit of pail contents in their neighbourhood, and to the accumulation of ashes in tips—opposition with which I agree entirely to a certain extent—surround the task of scavenging with almost insuperable difficulties for the present. Every facility should be given to owners to adopt water-closets, and they should be encouraged by the provision of a free supply of water, which, in my opinion, would be much less cost to the corporation than the gratuitous removal of pails. One point is overlooked, that the washing and cleansing of these pails take one half the quantity of water which would be necessary for the water-closets.—*From Dr. Kaye's Annual Report for* 1893.

The Disposal of the Refuse.

The urgent question of the disposal of ashes and refuse demands an immediate and settled line of action. The amount of refuse consumed at the Hillhouse destructor during 1893 was approximately 15,000 loads, or nearly 13,000 tons, leaving 37 per cent. of clinkers, in other words, each cell destroyed five tons per day. An erroneous notion has got abroad that excrement is cremated also, but this is not so. That matter is collected in pails and disposed of as manure, a system as costly as it is laborious, and each year's experience goes to show that the sooner water carriage is adopted the better, both for the health and pockets of the community. Householders can assist us greatly in keeping the ashpits and pails for their proper purposes, and thereby render as harmless as possible those nurseries of disease germs.

Fish Frying.

Fish frying has formed the subject of complaint. In investigating the matter I found that defective and badly-constructed frying pans combined with the use of cheap oils—such as cocoa-nut oil instead of beef fat—were the chief causes of the sickening smells. The apparatus should be so constructed as to prevent the boiling fat lodging in any part outside the pan which gets hot and evaporates part of the oil while the remainder is burnt, producing the easily recognised smell. The pan should be moveable for cleansing purposes and when in use the spluttering oil should fall back again into the pan by means of a tin funnel projecting into the pan and fitting close to the edge of the pan. The increase in this trade has been great during the past few years, and it is now time that it was included amongst the offensive trades, although we can deal with the nuisance under section 114, P. H. Act, 1875. Some of the premises in which fish frying is carried on are unsuitable, and this would be remedied by the necessity of registration.—*From Dr. Kaye's Annual Report*, 1893.

Diphtheria in Essex.

Dr. Thresh, in his annual report for 1893, says: "Throughout the whole of England and Wales there was an increased mortality from this disease, but our county death-rate is more than twice that of the whole country. The distribution is most erratic. For a series of years a district may remain comparatively free, then an epidemic occurs and the disease lingers in the neighbourhood for a longer or shorter time. In the autumn of 1893 severe epidemics occurred in several districts, causing a large number of deaths. In different districts also it differed much in severity of type. In the Winstree Rural District the mortality reached 60 per cent. of the notified cases, whereas in Chelmsford it was under 2 per cent. In Braintree, Saffron Walden, and Walton not a single case is known to have occurred; in 1892 Braintree was quite free, in Saffron Walden there were only one and in Walton three cases; and in 1891 there was only one case in Braintree, one in Saffron Walden, and none in Walton."

The Reduction in Amount of Enteric Fever at Cardiff.

"I have again with satisfaction to report a low rate of mortality from typhoid fever. The statistical tables in my report show that the death-rate from this disease has rapidly declined during the past few years, and that whereas the average mortality during the six years 1884-1889 was at the rate of 0·37 per 1,000, since 1890 the average rate has been 0·16 per 1,000, a high testimony to the improved sanitary condition of the town. Typhoid fever is a disease which is, perhaps, more closely associated with insanitary conditions than any other of the zymotic class. We may fairly assume, therefore, that the reduction of the death-rate from 2·0 to 0·16 per 1,000, which has taken place during the past forty years, is largely due to the improvements effected by the Sanitary Authority. Amongst these may be mentioned a pure water supply, a complete and efficient system of sewerage, a satisfactory method of collecting house and trade refuse, and a vigorous and systematic inspection of the district and the prompt abatement of nuisances therein."—*From Dr. Walford's Annual Report for* 1894.

Diphtheria in Connection with School Life.

Mr. Shirley Murphy in a preliminary memorandum on the increase of diphtheria in London, after an elaborate investigation of the statistical evidence available, comes to the following conclusions; 1. That antecedent to 1871-80, in groups of population where the diphtheria death rate at all ages was rising, the rate at ages 3-10 years, though generally rising also, rose in less degree than the all age rate; and that when the all age rate was falling, the rate at ages 3-10 years fell in even greater degree than the all age rate. 2. That in 1871-80, with a general decline of the diphtheria mortality at all ages, in the several groups of population, there occurred in each group at ages 3-10 years a relatively higher diphtheria death rate than before; that is, the diphtheria mortality at ages 3-10 years did not fall in 1871-80 in anything like the same degree as the diphtheria mortality at all ages. This new departure is most notable in London, least notable in the rural groups: and inasmuch as it is suggestive of a fresh factor of diphtheria at ages 3-10 years becoming operative in the decennium 1871-80, there is room for more regret that data for the decenninm 1881-90 are not available for all the groups of population that are in question. As regards England and Wales and London, however, in 1881-90 it may be pointed out that as compared with 1855-60 and 1861-70 the special incidence on the age 3-10 years is practically maintained.

A Presidential Address.

In an interesting address as President of the Worcestershire and Rutland Branch of the British Medical Association, Dr. Fosbrooke, the County Medical Officer for Worcestershire, draws attention to the caution that must be exercised to avoid reading into vital statistics, particularly crude death-rates, conclusions that may be founded on fallacies.

Dr. Fosbrooke is a strong believer in the ærial dissemination of small-pox, and considers that no small-pox hospital should be within half a mile of any dwelling.

Experience has taught him that "provided the buildings are fairly accessible, a properly-constituted hospital will serve for a district included in a circle with a diameter of from 20 to 24 miles, *i.e.*, the patients admitted (usually suffering from small-pox, scarlatina, or diphtheria) may, with impunity to themselves or the inhabitants of the neighbourhood through which they pass, be conveyed distances of from 10 to 12 miles, for such persons are usually removed either in the early stages of their illnesses or during convalescence."

The last portion of Dr. Fosbrooke's address is devoted to a consideration of the question as to whether cancer has increased in prevalence. On this point Dr. Fosbrooke very wisely refrains from committing himself. The figures given by him of the death-rates from cancer in the various sanitary districts of Worcestershire are extremely interesting. They show a death-rate from cancer varying from 7·7 per 10,000 in King's Norton and Malvern Link to nil in Tenbury, ·02 in Pershore, with various rates intermediate between these. These results can only be regarded as tentative, but if continued for a series of years, as they will be, they may lead to important conclusions.

Measles in Virgin Soil.

An interesting article by Dr. S. H. Davies (*B.M.J.*, May 19th, 1894) describes the first epidemic of measles in the Samoan group of South Pacific Islands. It was brought by a steamer. The epidemic was mild, the sequel and complications causing the mortality. The figures obtainable over the ten inhabited islands of this group are not very accurate, but it would appear that on fewer than 1,000 of the entire population of 34,500 died from measles between June and December, 1893, and nearly half of these were adults. The mortality in connection with the epidemic arose chiefly from gastritis, enteritis, diarrhœa, and dysentery. Nine-tenths of the deaths in Dr. Davies' opinion could have been prevented by care in diet. Strumous abscesses, which have always been common, have greatly increased since the advent of measles. Not one of the entire population seems to have escaped from measles, and the tendency to respiratory diseases which had been increased by the two epidemics of influenza at the end of 1891 and in January, 1893, has been intensified by the recent epidemic of measles.

Subsoil Water and Diphtheria.

Contrary, I dare say, to the general impression, having regard to the almost absolute drought of ten weeks duration, lasting from March 2nd to May 17th, the subsoil was more saturated during 1893 than it had ever been since the daily observations upon the height of the subsoil water were commenced in 1884. Taking the year round, it stood at my laboratory 193·97 inches beneath the surface, reaching its maximum height 181·20 during March in the tenth week of the year, and its minimum 203·76 in September during the thirty-ninth week. So that the drying of the soil found to be associated with freedom from diphtheria was never so little accomplished since these observations began; month by month, and every month the subsoil water stood at a higher level than the average for the time of the year, and mostly so during the first six and the last three months. The time incidence of the high and low tides were as follows: During the late autumn of 1892 there was a very high tide, followed by an ebb in the course of the early and mid-winter of 1893, this was succeeded during the first week in March by the highest tide I have known, then followed a rapid ebb, interrupted by

two conspicuous risings, one early in June and another at the beginning of July, the lowest point being reached late in September; then came a rapid autumnal rise far exceeding the average amount, so that, looked at from a health point of view, I regard the year as having been as respects the subsoil water, very favourable to the prevalence of diphtheria, and so it proved.—*From Dr. Adams' Annual Report for Maidstone*, 1893.

Measles æt. 77.

In going over the registrar's returns, I was struck by the record of a death from measles of a man aged 77, at Rowardennan in the parish of Arrochar. I wrote to Dr. Dunlop, the medical attendant, regarding it and had the following interesting reply: "The case of D. M'N. was indeed a peculiar one. He stayed with his married nephew, a man named M'G., aged 53, who has a family aged 22, 18, 16, 11, 6. None of these had had measles before, though M'G. assures me it had often been in their neighbourhood. The old man M'N. was the first who sickened. He had stayed for three nights with some friends at a distance, just a fortnight before he developed the disease—in the interval he had not been exposed to the infection. When I first saw him the rash was well out, and the other prominent symptoms well marked, so that, although much surprised, I had no doubt whatever as to the nature of the case. The fact that he had not before had measles I also ascertained at the time. The bronchitis was, of course, a marked feature, but he did exceedingly well for some days, when he died, apparently from heart failure. The nephew, aged 53, and the members of his family, whose ages are given above, were afterwards all attacked, their cases occurring intermittently, sometimes with an interval of a fortnight. The nephew's case was very severe, the others much milder. All made good recoveries. The only member of the family who escaped was the wife of the nephew of M'G.—she had had the disease before. It is not infrequent in this neighbourhood to come across adult cases—I mean far in excess of the usual proportion." It is recorded in medical works that when measles first visits an island community which has never been exposed to the disease it strikes old and young alike. Such facts have led to the opinion that the reason why measles is in most countries almost entirely a disease of childhood, is simply because the infection is so prevalent that almost all children are exposed to it within a few years of their birth. These cases at Arrochar go some way in support of this view, though it is to be observed that the disease had often been "in the neighbourhood" of the adults who were ultimately attacked. No doubt, however, they had not lived in such close contact with the poison as is customary in town populations.—*From Dr. M'Vail's Report, C.C., Dumbarton*, 1893.

REVIEWS.

Domestic Hygiene. By T. Dutton, M.D. (Kimpton, 82, High Holborn. 1894.)—A useful popular manual, applying the rudiments of hygiene in a practical form for household use.

Dry Methods of Sanitation. By G. V. Poore, M.D., F.R.C.P., Stanford.—A suggestive paper, like his well-known book "Rural Hygiene." Its purport may be gathered from the following sentence: "The cry at present is '*tout à l'égout*,' a cry which is bred of ignorance, moral cowardice, and despair." And again, "If a very small amount of the ingenuity which has been lavished upon water carriage had been devoted to overcoming the difficulties which attend the safe and decent management of dry methods these difficulties would, I believe, have long since disappeared." Illustrations are given of the methods suggested.

Foul Fish and Filth Fevers. Reforms and Improvements Suggested for the Fisheries of Great Britain and Ireland. By J. Lawrence-Hamilton, M.R.C.S. Contributed to the World's Fisheries Congress, Chicago, 1893.—These two pamphlets contain a great deal of valuable information as to the dangers attending the present methods of fish capture and the way in which they are kept in fishmongers' shops. The remedies suggested are: (1) Organized Government fish inspection; (2) prohibition of unbled and ungutted fish in markets; (3) formation of a Department for Fisheries, just as there is now a Department for Agriculture; (4) free technical schools for fisherfolks. The author points out clearly the advantages of keeping fish in dry-air refrigerator chambers and the disadvantages of keeping them as now on ice. Fish should be kept dry, not moist.

APPOINTMENTS.

Medical Officers of Health.

Beresford, R. de la Poer, M.D.Glas., L.R.C.P., L.R.C.S.Edin., re-appointed M.O.H. to the Oswestry Town Council.

Beasley, Dr., appointed M.O.H. to the Rowley Regis Local Board.

Bullmore, W. R., M.D.St. And., M.R.C.S.Eng., re-appointed M.O.H. to the Falmouth and Truro P.S.A.

Cass, E. E, M.B., B.S.Durh., appointed M.O.H. for the Bootle U.L.S.D.

Deans, William, M.B., C.M.Aberd., re-appointed M.O.H. to the Ramsbottom Local Board.

Eglinton, George W., L.R.C.P.Edin., L.F.P.S.Glas., re-appointed M.O.H. to the Street Local Board.

Gaylor, Edward, L.R.C.P.Edin., L.F.P.S.Glas., re-appointed M.O.H. for the Ripley U.S.D.

Goodfellow, Dr., re-appointed M.O.H. to the Brampton Local Board.

Gale, Arthur Knight, L.R.C.P.Lond., M.R.C.S. Eng., re-appointed M.O.H. to the Ecclesall Bierlow R.S.A.

Holt, H. Mainwaring, M.R.C.S., L.S.A., D.P.H., re-appointed M.O.H. to the Malton U.S.A.

Lake, W. Wellington, M.R.C.S.Eng., re-appointed M.O.H. to the Guildford R.S.A.

Norton, J. M. D., M.R.C.S., appointed M.O.H. to the Vestry of St. Margaret and St. John, Westminster.

Nicoll, J. M., M.B., C.M.Edin., appointed M.O.H. for the Borough of Jarrow, and Medical Superintendent to the Borough Hospital.

Palmer, A. M., L.R.C.P.Edin., M.R.C.S.Eng., re-appointed M.O.H. to the Whittington U.S.D.

Palmer, H. L., M.R.C.S.Eng., re appointed M.O.H. to the Newtown U.S.D.

Robertson, D. W., L.R.C.P.Edin., L.M., M.R.C.S. Eng., re-appointed M.O.H. to the Pickering Local Board.

Storey, J. A. L.R.C.P.Edin., L.R.C.S.I., appointed M.O.H. to the Dunstable Town Council.

Saunders, Sedgwick, M.D., L.R.C.P., M.R.C.S., re-appointed M.O.H. for the City of London.

Soper, R. W., M.R.C.S.Eng., L.S.A., re-appointed M.O.H. to the Dartmouth Town Council.

Webb, William Henry, M.D.Durh., L.R.C.P.Lond., M.R.C.S.Eng., appointed M.O.H. to Kingsbridge R.S.A.

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